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PREFACE

The following report was compiled by David L. DeGiacomo, Summer Employee of the Bureau of Land Management from 9 May 77 to 12 August 77.

The project required the compilation of historical milling and mining costs for various mineral operations in the U.S.

The data for the report were obtained from U.S. Bureau of Mines IC's (information circulars) located in the Bureau of Mines Library in Building 20, Denver Federal Center, Denver, Colorado.

The data in the IC's were used to complete the appropriate enclosed information forms in mining, milling, or both. Often the information obtained in this manner was incomplete. Sometimes the information provided was in non-conventional form or did not contain all of the required information.

The information forms are cross indexed in three ways:

1) Year of Publication of IC
2) Commodity
3) State of Operation

Identical information is available under all three compiling systems.

The year of publication report index contains all IC's published in a given year. The commodity and state are also noted in the index.

The commodity report contains all IC's covering a given commodity. The year of publication and state are also noted.

The state of operation report contains all IC reports concerning mineral operations in a given state. The year of publication and commodity are also noted.

The year of publication will usually be 1-4 years ahead of the data used for the report. An asterisk (*) by an IC number in the index indicates an information form has been compiled and filed under the appropriate headings. (N.A.-not applicable or not available).

Since much of the available information concerning individual mining and milling operations occurs in IC's of the 1930's, further research in the area of IC's may not be very productive. Since 1970, the IC's concerning mining and milling have been done on a commodity availability basis, based on a hypothetical operation.

In order to obtain more current data contact U.S. Bureau of Mines Commodity Specialists in the Washington Office. The USBM Materials Availability System (MAS) will soon have cost estimating capabilities. For more information regarding MAS, contact Harold Bennett, U.S. Bureau of Mines, 234-2535 (FTS).

MINING - COMMODITY

Aggregates

IC 6705 - 1933 - California

Antimony

IC 7194 - 1942 - Idaho

Asbestos

* IC 7986 - 1961 - Arizona
* IC 8068 - 1962 - Vermont
* IC 8672 - 1975 - Alaska

Cement Rock

IC 6448 - 1931 - Pennsylvania

Chrome

* IC 8204 - 1963 - Montana

Clay

IC 6657 - 1932 - Michigan
IC 6962 - 1937 - Ohio

Coal

* IC 8682A- 1975 - General
IC 6928 - 1936 - Virginia
* IC 7891 - 1959 - North Dakota
IC 6151 - 1929 - Pennsylvania
IC 6107 - 1929 - Arizona
IC 6208 - 1929 - Ohio
IC 6119 - 1929 - Pennsylvania
IC 6152 - 1929 - Pennsylvania
* IC 8689 - 1975 - General
* IC 8703 - 1976 - General
* IC 8715 - 1976 - General
IC 8720 - 1976 - General
IC 6409 - 1930 - General

Copper

* IC 8602 - 1973 - Alaska
* IC 8656 - 1974 - Alaska, Arizona
* IC 8271 - 1965 - Arizona
* IC 8129 - 1962 - Nevada
* IC 8154 - 1963 - Arizona
* IC 8153 - 1963 - Arizona
* IC 7502 - 1949 - New Mexico
IC 6565 - 1932 - Chile
IC 6149 - 1929 - Tennessee
IC 6289 - 1930 - Arizona

MINING - COMMODITY

Copper (cont.)

IC 6247 - 1930 - Mexico
IC 6515 - 1931 - Michigan
IC 6412 - 1931 - New Mexico
IC 6526 - 1931 - Michigan
IC 6413 - 1931 - New Mexico
IC 6260 - 1930 - California
IC 6851 - 1935 - Utah
IC 7029 - 1938 - Nevada
IC 6377 - 1930 - New Mexico
IC 6240 - 1930 - Idaho
IC 7448 - 1948 - Washington
IC 7870 - 1958 - Washington
IC 6169 - 1929 - Arizona
IC 6168 - 1929 - Arizona
IC 6666 - 1932 - Arizona
IC 6237 - 1930 - Arizona
IC 7929 - 1959 - Arizona
IC 6368 - 1930 - New Mexico
IC 6307 - 1930 - Mexico
IC 6167 - 1929 - Arizona
IC 6736 - 1933 - Mexico
IC 6248 - 1930 - Arizona
IC 6440 - 1931 - Arizona
IC 6250 - 1930 - Arizona
IC 6234 - 1930 - Utah
IC 6464 - 1931 - Arizona

Ferberite

IC 6673 - 1932 - Colorado

Fluorspar

* IC 7956 - 1960 - Illinois
IC 6294 - 1930 - Illinois
IC 6384 - 1930 - Illinois

Glass - Sand

IC 6937 - 1937 - California

Gold

* IC 8374 - 1968 - Colorado
IC 6186 - 1929 - Arizona
IC 7058 - 1936 - Colorado
IC 7101 - 1940 - Colorado
IC 6311 - 1930 - California
IC 7903 - 1959 - Philippine Islands
IC 6824 - 1935 - Arizona
IC 6940 - 1937 - California

MINING - COMMODITY

Gold

IC 6512 - 1931 - California
IC 6806 - 1934 - Colorado
IC 6413 - 1931 - New Mexico
IC 6543 - 1931 - Nevada
IC 6851 - 1935 - Utah
IC 6985 - 1938 - Idaho
IC 7024 - 1938 - Idaho
IC 6947 - 1937 - Montana
IC 6709 - 1933 - Quebec
IC 6976 - 1937 - Colorado
IC 7111 - 1940 - South Carolina
IC 6799 - 1934 - Arizona
IC 6914 - 1936 - Alabama
IC 7870 - 1958 - Washington
IC 7039 - 1938 - Idaho
IC 7123 - 1940 - Washington
IC 7164 - 1941 - California
IC 6741 - 1933 - Ontario
IC 6512 - 1931 - California
IC 7015 - 1938 - Oregon
IC 6880 - 1936 - Utah
IC 6945 - 1937 - Arizona
IC 6611 - 1932 - Mexico
IC 6470 - 1931 - Ontario
IC 7094 - 1940 - Colorado
IC 6402 - 1931 - Montana
IC 6990 - 1938 - Colorado
IC 6322 - 1930 - Ontario
IC 6612 - 1932 - California
IC 6525 - 1931 - Ontario
IC 6991 - 1938 - Arizona
IC 6900 - 1936 - California
IC 7096 - 1940 - California
IC 7194 - 1942 - Idaho

Gypsum

IC 6615 - 1932 - Nevada
IC 6917 - 1937 - New York
IC 6967 - 1937 - New York

Hematite

IC 6348 - 1930 - Michigan
IC 6138 - 1929 - Michigan
IC 6180 - 1929 - Michigan
IC 6179 - 1929 - Michigan
IC 6390 - 1930 - Michigan
IC 6380 - 1930 - Michigan

Iron

* IC 7971 - 1960 - Michigan
* IC 8181 - 1963 - Michigan
IC 6361 - 1930 - New Mexico
IC 7807 - 1957 - Missouri
IC 6397 - 1931 - Tennessee
IC 6325 - 1930 - Minnesota
IC 6369 - 1930 - Wisconsin

Lead

* IC 8646 - 1974 - General
* IC 8174 - 1963 - Washington
* IC 8028 - 1961 - Missouri
* IC 7524 - 1949 - New Mexico
IC 6159 - 1929 - Kansas, Missouri, Oklahoma
IC 6416 - 1931 - Montana
IC 7828 - 1958 - Utah
* IC 7930 - 1959 - Oklahoma
IC 6586 - 1932 - New York
IC 6804 - 1934 - Mexico
IC 6851 - 1935 - Utah
IC 7780 - 1957 - Illinois
IC 6377 - 1930 - New Mexico
IC 6286 - 1930 - Kansas
IC 6656 - 1932 - Kansas
IC 6232 - 1930 - Idaho
* IC 7560 - 1950 - Idaho
IC 7875 - 1959 - Missouri
IC 7003 - 1938 - Utah
IC 7507 - 1949 - New Mexico
IC 7428 - 1948 - Idaho
IC 6113 - 1929 - Oklahoma
IC 6121 - 1929 - Oklahoma
IC 6174 - 1929 - Kansas
* IC 7743 - 1956 - Idaho
IC 6238 - 1930 - Idaho
IC 6160 - 1929 - Missouri
IC 6290 - 1930 - Utah
IC 6368 - 1930 - New Mexico
IC 7152 - 1941 - Washington
* IC 7823 - 1958 - Oklahoma
IC 6823 - 1935 - Idaho
IC 6371 - 1930 - Utah
IC 6170 - 1929 - Missouri
IC 6232 - 1930 - Idaho
IC 7077 - 1939 - Arizona
IC 6360 - 1930 - Utah
* IC 7774 - 1957 - Kansas

Limestone

* IC 8084 - 1962 - Kansas
* IC 8199 - 1963 - Iowa
* IC 8214 - 1964 - Virginia
* IC 8198 - 1963 - Tennessee
IC 6795 - 1934 - California
* IC 7793 - 1957 - Virginia
IC 6513 - 1931 - Texas
IC 6446 - 1931 - Pennsylvania

Magnetite

IC 6092 - 1928 - New York
IC 6601 - 1932 - New Jersey

Manganese

* IC 8095 - 1962 - Arkansas
* IC 8144 - 1963 - Arizona

Mercury

* IC 8131 - 1962 - Alaska
* IC 8109 - 1962 - California
IC 6276 - 1930 - Oregon
IC 6462 - 1931 - California
IC 6950 - 1937 - California
* IC 7800 - 1957 - Idaho

Mica

IC 6616 - 1932 - North Carolina

Molybdenum

IC 6514 - 1931 - New Mexico

Nickel

IC 7029 - 1938 - Nevada
* IC 8469 - 1970 - General

Pegmatites

IC 7550 - 1950 - General

Quartz

IC 6963 - 1937 - Montana

Quartzite

* IC 8248 - 1965 - Pennsylvania

Sand & Gravel

* IC 8202 - 1963 - Iowa
* IC 8092 - 1962 - Michigan
* IC 8157 - 1963 - Minnesota
IC 6581 - 1932 - Texas
IC 6607 - 1933 - (& boulders)-California
IC 6676 - 1933 - Connecticut
IC 6910 - 1936 - Texas
IC 6652 - 1932 - Texas
IC 6420 - 1931 - New Jersey
IC 6692 - 1933 - (just gravel)-Indiana
IC 6592 - 1932 - New York
IC 6580 - 1932 - Michigan

Silver

* IC 8370 - 1968 - Colorado
IC 7101 - 1940 - Colorado
IC 7119 - 1940 - Arizona
IC 6327 - 1930 - Nevada
IC 6413 - 1931 - New Mexico
IC 6804 - 1934 - Mexico
IC 6851 - 1935 - Utah
IC 6661 - 1932 - Mexico
IC 7870 - 1958 - Washington
IC 7003 - 1938 - Utah
* IC 7743 - 1956 - Idaho
IC 6238 - 1930 - Idaho
IC 6880 - 1936 - Utah
IC 6290 - 1930 - Utah
IC 6371 - 1930 - Utah
IC 6360 - 1930 - Utah
IC 7194 - 1942 - Idaho

Talc

* IC 8142 - 1963 - Vermont

Tin

IC 7084 - 1939 - South Dakota
IC 7871 - 1958 - Alaska

Trap Rock

IC 6405 - 1931 - Pennsylvania

Tungsten

* IC 7945 - 1960 - California
IC 6284 - 1930 - Nevada
IC 7854 - 1958 - Nevada
* IC 7907 - 1959 - Nevada
* IC 8500 - 1971 - General

MINING - COMMODITY

Uranium

* IC 8280 - 1965 - New Mexico
* IC 7963 - 1960 - Colorado
* IC 8015 - 1961 - Colorado, Utah
* IC 7766 - 1956 - Utah
* IC 7811 - 1957 - Utah
IC 7908 - 1959 - Colorado, Utah
* IC 7801 - 1957 - Utah
IC 7803 - 1957 - Utah
* IC 7922 - 1959 - Colorado, Utah
* IC 8011 - 1961 - Arizona
* IC 8151 - 1963 - Wyoming

Vanadium

* IC 7766 - 1956 - Utah
IC 6662 - 1932 - Colorado

Zinc

* IC 8174 - 1963 - Washington
IC 6150 - 1929 - Missouri
* IC 7524 - 1949 - New Mexico
IC 6159 - 1929 - Kansas, Missouri, Oklahoma
IC 6370 - 1930 - Montana
IC 6407 - 1931 - Idaho
IC 7828 - 1958 - Utah
* IC 7930 - 1959 - Oklahoma
IC 6804 - 1934 - Mexico
* IC 7780 - 1957 - Illinois
IC 6377 - 1930 - New Mexico
IC 6286 - 1930 - Kansas
IC 6656 - 1932 - Kansas
* IC 7560 - 1950 - Idaho
IC 7870 - 1958 - Washington
IC 7003 - 1938 - Utah
IC 7507 - 1949 - New Mexico
IC 7428 - 1948 - Idaho
IC 6113 - 1929 - Oklahoma
IC 6121 - 1929 - Oklahoma
IC 6174 - 1929 - Kansas
* IC 7743 - 1956 - Idaho
IC 6238 - 1930 - Idaho
IC 6239 - 1930 - Tennessee
IC 6290 - 1930 - Utah
IC 6368 - 1930 - New Mexico
IC 7152 - 1941 - Washington
* IC 7823 - 1958 - Oklahoma
IC 6371 - 1930 - Utah
IC 7077 - 1939 - Arizona
* IC 7774 - 1957 - Kansas

MINING

Miscellaneous

Mining World - May 1957 - Gold, Silver - South Dakota
Colorado State Office - 1959 - Fluorspar - Colorado
Uranium - February 1958 - Uranium - New Mexico
Uranium - February 1958 - Uranium - Wyoming
Uranium - February 1958 - Uranium - Utah (White Canyon - Monument Valley District)
Uranium - February 1958 - Uranium - Colorado
Uranium - February 1958 - Uranium - Utah (Big Indian District)
Uranium Industry Seminar - 1976 - Uranium - General

ASBESTOS

MINING COST DATA

MINERAL: Asbestos **YEAR:** 1958

State: Arizona

District or County: Gila County

Mine: Regal Asbestos Mine

Owner or Operator: Jaqvays Mining Corp.

Source of Information: IC 7986

Type of Deposit:
Precambrian Mescal limestone formation. The asbestos is of the chrysotile variety, a hydrous magnesium silicate with the same composition as serpentine

Mining Method: Random room and pillar

Tonnage: 26,995 tons (1958) **No. of Employees:** 70 (1931)

Tons per Man-shift: N.A

Miners Wages per time period: $3.50 - $4.75/day (1930-31)

Direct Mining Costs per ton $235.887

Indirect Mining Costs per ton . . . . $ 31.332

Fixed Costs per ton . . . . $ 23.413

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . N.A

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $ 290.632

Market: Mill **Distance to Market:** 45 miles

Haulage Costs:

Method of Waste Disposal: Sold to west coast firm for stucco & paint produc

Method of Mined Land Rehabilitation: N.A.

Remarks:
cost figures from 1931 based on cost per ton of fiber produced.

ndirect Costs

Labor, Management, Supervision, Clerical - $31,332.

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor - $133,610

Maintenance Labor

Operating Supplies, Powder, Steel - $37,46 (includes repairs)

Utilities - $14,052 (includes shop and blacksmith labor)

Transportation Mine to Mill - $15,00

Freight, Supplies Delivered - $35,765 (includes repairs)

Future Development Costs

Maintenance and Service of Equipment

Fixed Costs

Property Taxes
Other Fixed Taxes (Severance) } $23,413 (includes insurance, taxes, depreciation and depletion)

Depreciation N.A.

Interest N.A

General Management N.A

Selling, Marketing NA

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Asbestos **YEAR:** 1958

State: Vermont

District or County: Lamoille and Orleans counties

Mine: Vermont Asbestos Mines

Owner or Operator: The Ruberoid

Source of Information: IC 8068

Type of Deposit:
The fibers occur in veins in serpentinized rock and exhibit cross and slip fiber habits. Cross fibers are nearly perpendicular to the vein walls and occur as①

Mining Method: Surface mining (quarries)

Tonnage: 833,480 tons (Jan-June 1959) **No. of Employees:** 248

Tons per Man-shift: N.A **Miners Wages per time period:** N.A

Direct Mining Costs per ton . . . .
Indirect Mining Costs per ton . . . .
Fixed Costs per ton . . . .
Capitalization Costs per ton . . . .
Cost of Rehabilitation per ton . . . .
Total Mining costs per ton (excluding Milling) . . .
Milling Costs per ton . . . .
Total Costs per ton including Mining & Milling . . .

units inconsistent see attached sheet.

Market: Primary Crusher **Distance to Market:** 500-700 yards

Haulage Costs: 0.015 man hrs/ton

Method of Waste Disposal: Dumps

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

simple veins, stockworks of veins, or series of closely spaced, parallel ribbon veins.

irect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor
Maintenance Labor } 0.031 man hrs/ton

Operating Supplies, Powder, Steel - $0.083/ton

Utilities - 0.84 horsepower-hrs/ton

Transportation Mine to Mill - 0.015 man hrs/ton

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Blast hole drilling - $1.389/ft
Powder - 0.368 lbs/ton

Overburden stripping $0.808
Core drilling $2.83/ft

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Primary and Secondary Crushing (per ton crushed)	
Direct operating and maint. labor	0.022 man hrs
Power	2.45 horsepower hrs
Maintenance materials	$ 0.024
Ore drying (per ton dried)	
Operating & maintenance labor	0.040 man hrs
Fuel oil	0.973 gallons
Power	4.96 horsepower-hrs
Maintenance Materials	$0.022
Transport of fiber (per ton mile)	$ 0.089

MINING COST DATA

MINERAL: Asbestos **YEAR:** 1973

State: Alaska

District or County: 45 miles SW of Eagle, Alaska

Mine: Unnamed Economic Availability Study

Owner or Operator: N.A

Source of Information: IC 8672

Type of Deposit:
Large joint blocks of dark gray, black, and dark green and brownish-black serpentine (antigorite). The rock is cut by closely spaced subparallel veins of cross-fiber chrysot asbestos.

Mining Method: Open pit

Tonnage: 18,400 tons/day **No. of Employees:** N.A.

Tons per Man-shift: N.A **Miners Wages per time period:** $7.08 /hr

Direct Mining Costs per ton $2.95

Indirect Mining Costs per ton $1.08

Fixed Costs per ton $0.36

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $4.39

Milling Costs per ton $6.02

Total Costs per ton including Mining & Milling . . . $10.41

Market: N.A **Distance to Market:** N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:
Costs derived from the Clinton Mine Div., Cassiar Asbestos Corp., Ltd

Indirect Costs

Labor, Management, Supervision, Clerical - $0.51

Mine Office, Warehouse - $0.17 (General Overhead)

Payroll Overhead - Social Security, Insurance - $0.40

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor - $0.59

Maintenance Labor - $0.48

Operating Supplies, Powder, Steel - $1.58

Utilities - $0.10

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Taxable subsidies - $0.20

Fixed Costs

Property Taxes - $0.18

Other Fixed Taxes (Severance) - $0.18 (Taxes and Insurance)

Depreciation N.A

Interest N.A.

General Management N.A

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

CHROME

MINING COST DATA

MINERAL: Chrome **YEAR:** 1959①

State: Montana

District or County: Stillwater County

Mine: Mouat Mine

Owner or Operator: American

Source of Information: IC 8204

Type of Deposit: Chromite, in a series of steeply dipping bands or lenses roughly paralleling the layering of the complex. Deposits are nearly massive chromite or are banded

Mining Method: Lightweight stopers to advance a flat back by breaking from a centrally located face

Tonnage: 221,144 tons **No. of Employees:** 74

Tons per Man-shift: 13.1 tons **Miners Wages per time period:**② $2.15-$2.77/hr.

Direct Mining Costs per ton . . . . 58.29 % of TC

Indirect Mining Costs per ton . . . . 28.50 % of TC

Fixed Costs per ton . . . . included in IC

Capitalization Costs per ton . . . . N/A.

Cost of Rehabilitation per ton . . . . NA

Total Mining costs per ton (excluding Milling) . . . 86.79% of TC

Milling Costs per ton . . . . 13.21 % of TC

Total Costs per ton including Mining & Milling . . . 100.00% of TC

Market: Mill **Distance to Market:** on site

Haulage Costs: 16.86% of cost of 1953

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

① Data also available for 1953-1958

over ↓

A bonus system guaranteeing a miner a day's pay rate was in effect from the start of operations in 1953.

ndirect Costs

Labor, Management, Supervision, Clerical 7.18% of TC

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties 21.32% of TC (other expenses & royalties excluding income tax and royalties)

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

} 31.89% of TC (including freight)

Transportation Mine to Mill 2.29% of TC

Freight, Supplies Delivered

Future Development Costs 0.81% of TC

Maintenance and Service of Equipment 23.30% of TC (includes surface)

Fixed Costs

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

} included in other expenses also selling, marketing

General Management included in administration

Selling, Marketing

Capital Costs

Working Capital N.A.

Purchase Cost N.A.

Capitalization of Exploration and Development N.A

Roads and other local construction N.A.

Capitalization of Equipment N.A

Capitalization of Plant N.A

COAL

(Coal, 3.18 MM Tpy)

MINING COST DATA

MINERAL: Coal

YEAR: 1974 - 1975

State: N.A.

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8682 A

Type of Deposit:
72 inch coalbed

Mining Method: Main entry along center axis with production headings to the right and left

Tonnage:
3.18 MM Tpy

No. of Employees: 633 ①

Tons per Man-shift:
N.A.

Miners Wages per time period:
$47.03 - $55.00 /shift (day)

Direct Mining Costs per ton $4.19

Indirect Mining Costs per ton $2.91

Fixed Costs per ton $1.08

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $8.18

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $9.18

Market: N.A

Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

selling price per ton: $11.63

over ↓

① Underground - 544
Outside - 18
Salaried - 71
633

Indirect Costs

Labor, Management, Supervision, Clerks - $0.32

Mine Office, Warehouse [illegible]

Payroll Overhead - Social Security, Insurance - $0.54

Union Welfare, etc. - $1.02

Medical and Life Insurance N/A

Royalties N/A

Pension Funds N/A

Severance Tax N/A

Rehabilitation Costs N/A

Indirect Costs - $2.63

Direct Operating Costs

Production Labor - $1.79

Maintenance Labor - $0.25

Operating Supplies, Powder, Steel - $1.04

Utilities - $0.32

Transportation Mine to Mill N/A

Freight, Supplies Delivered N/A

Future Development Costs N/A

Maintenance and Service of Equipment N/A

Fixed Costs

Property Taxes N/A

Other Fixed Taxes Assessment $0.10 [illegible]

Depreciation - $0.78

Interest N/A

General Management N/A

Selling, Marketing N/A

(Coal, 3.18 M.M tpy)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.32

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $0.94

Union Welfare, etc. - $1.02

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A

Indirect costs - $0.63

Direct Operating Costs

Production Labor - $ 1.78

Maintenance Labor - $0.25

Operating Supplies, Powder, Steel - $1.84

Utilities - $0.32

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A

Other Fixed Taxes ~~(Severance)~~ - $0.30 (tax and insurance)

Depreciation - $0.78

Interest N.A

General Management N.A.

Selling, Marketing N.A

(Coal, 3.18 MM tpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total Capital Investment and deferred investment - $81,018,300 (including $5,715,300 working capital)

(Coal, 2.04 MM tpy)

MINING COST DATA

MINERAL: Coal

YEAR: 1974 - 1975

State: N.A

District or County: N.A

Mineral Availability Study

Mine: unnamed

Owner or Operator: N.A

Source of Information: IC 8682 A

Type of Deposit:
72 inch coalbed

Mining Method: Main entry along center axis with production headings to the right and left

Tonnage: 2.04 MM tpy

No. of Employees: 428 ①

Tons per Man-shift: N.A.

Miners Wages per time period: $47.03 - $55.00/shift (day)

Direct Mining Costs per ton $4.27

Indirect Mining Costs per ton $3.06

Fixed Costs per ton $1.17

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $8.50

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $8.50

Market: N.A.

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

selling price per ton: $12.08

over ↓

① Underground - 357
Outside - 15
Salaried · 156
428

(Coal, 2.04 MM tpy

Indirect Costs

Labor, Management, Supervision, Clerical - $0.39

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.99

Union Welfare, etc. - $1.03

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A.

Indirect costs - $0.65

Direct Operating Costs

Production Labor - $1.82

Maintenance Labor - $0.27

Operating Supplies, Powder, Steel - $1.84

Utilities - $0.34

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.31 (Taxes and insurance)

Depreciation - $0.86

Interest N.A

General Management N.A

Selling, Marketing N.A.

(Coal, 2.04 MMtpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total Capital Investment and deferred investment $55,558,000 (including $3,785,800 working capital)

(Coal 1.06 MM tpy)

MINING COST DATA

MINERAL: Coal

YEAR: 1974 - 1975

State: N.A.

District or County: N.A.

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8682 A

Type of Deposit:

72 inch coalbed

Mining Method: Main entry along center axis with production headings to the right and left.

Tonnage: 1.06 MM Tpy

No. of Employees: 246 ①

Tons per Man-shift: N.A.

Miners Wages per time period: $47.03 - $55.00 / shift (day)

Direct Mining Costs per ton $4.40

Indirect Mining Costs per ton $3.43

Fixed Costs per ton $1.36

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $9.19

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $9.19

Market: N.A.

Distance to Market: N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

① Underground - 192
Outside + 11
Salaried - 43
246

(Coal 1.06 MM tpy)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.58

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance – $1.11

Union Welfare, etc. – $1.05

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A

Indirect costs – $0.69

Direct Operating Costs

Production Labor – $1.89

Maintenance Labor – $0.29

Operating Supplies, Powder, Steel – $1.84

Utilities – $0.38

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes ~~(Severance)~~ – $0.33 (Taxes and insurance)

Depreciation – $1.03

Interest N.A

General Management N.A.

Selling, Marketing N.A.

(Coal 1.06 MM tpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital investment and deferred investment - $32,506,800 (including $2,105,600 working capital)

(Coal, 4.99 MMtpy)

MINING COST DATA

MINERAL: Coal YEAR: 1974 - 1975

State: N.A.

District or County: N.A Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8682 A

Type of Deposit:

72 inch coalbed

Mining Method: Main entry along center axis with production headings to the right and left.

Tonnage: 4.99 MM tpy

No. of Employees: 997 ①

Tons per Man-shift: N.A.

Miners Wages per time period: $47.03-$55.00 /shift (day)

Direct Mining Costs per ton $4.20

Indirect Mining Costs per ton $2.89

Fixed Costs per ton $1.03

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $8.12

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $8.12

Market: N.A.

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

selling price per ton: $11.64

over ↓

① Underground - 861
Outside - 27
Salary - 109
997

(Coal, 4.99 mill tpy)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.31

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance – $0.93

Union Welfare, etc. – $1.02

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A.

Indirect costs - $0.63

Direct Operating Costs

Production Labor – $1.79

Maintenance Labor – $0.25

Operating Supplies, Powder, Steel – $1.84

Utilities – $0.32

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes ~~(Severance)~~ - $0.29 (Taxes and insurance)

Depreciation – $ 0.74

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Coal, 4.99 MM tpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital investment and deferred investment - $122,983,500 (including $8,914,900 working capital)

RECENT MINING COST DATA

Mineral: Lignite

Year: 1955-56

State: North Dakota

Mining Dist. or County: Western Part

Mine: Average of 4 mines

Owner: Truax-Traer Coal Co., Baukol-Noonan, Inc., Knife-River Coal Co.

Type of Deposit: Lignite coal, 3'-18' thick, OB 30-70' thick

Mining Method: Contour Strip

Type of Milling:

Tonnage: Approx. aver. 1,000 T/day

No. of Employees:

Tons per man-shift: 31-56 - 41 aver.

Miners Wage: 2.50/hr.

Exploration Costs per ton:..................................	Not included in totals
Development Costs per ton:..................................	0.28 (stripping)
Direct Mining Costs per ton:................................	0.56
Indirect Costs per ton:.....................................	0.08
Depreciation of Plant & Equipment per ton:..................	0.41 overhead
Total Costs excluding milling costs (per ton):..............	1.33 1/
Milling Costs per ton:......................................	
Total Costs including milling costs (per ton):..............	$

Source: USBM IC 7891

Remarks: 70 % extraction

1/ Does not include exploration costs.

(Bit. Coal 3.09 MMtpy)

MINING COST DATA

MINEF : Bituminous Coal YEAR: 1975

State: N.A.

District or County: N.A.

Economic Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8689

Type of Deposit:
48 inch coal bed

Mining Method: Main entries along the center axis of the property with production headings on the right and left

Tonnage: 3.09 million tpy

No. of Employees: 677

Tons per Man-shift: ①

Miners Wages per time period: $47.03 - $55/shift

Direct Mining Costs per ton $4.34

Indirect Mining Costs per ton $3.09

Fixed Costs per ton $1.18

Capitalization Costs per ton . . . . N.A. (see attached sheet)

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $8.61

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $8.61

Market: N.A.

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① Continuous miner sections produce 312 tons of coal per unit per shift. Eighteen continuous miners purchased, 15 in use at any one time

(Bit Coal 3.09 MMTpy)

irect Costs

Labor, Management, Supervision, Clerical - $0.34

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance - $1.03

Union Welfare, etc. - $1.05

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Indirect cost - $0.67

Direct Operating Costs

Production Labor - $1.95

Maintenance Labor - $0.29

Operating Supplies, Powder, Steel - $1.84

Utilities - $0.26

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

Fixed Costs

Property Taxes

Other Fixed Taxes (Severance) - $0.38 (Taxes and insurance)

Depreciation - $0.80

Interest

General Management

Selling, Marketing

(Bit. Coal 3.09 MM tpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Development Cost - $7.76/ton
total - $13,639,100
tonnage - 1,759,000

Total capital investment - $37,437,500
(including $2,140,200 working capital)

(B.T. Coal 2.06 MM tpy)

MINING COST DATA

MINERAL: Bituminous Coal **YEAR:** 1975

State: N.A.

District or County: N.A Economic Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8689

Type of Deposit:
48-inch coal bed

Mining Method: Main entries along the center axis of the property with production headings on the right and left

Tonnage:
2.06 million tpy

No. of Employees: 464

Tons per Man-shift: ①

Miners Wages per time period:
$47.03 - $55.00 /shift

Direct Mining Costs per ton	$4.35
Indirect Mining Costs per ton	$3.19
Fixed Costs per ton	$1.25
Capitalization Costs per ton	N.A. (see attached sheet)
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$8.79
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling . . .	$8.79

Market: N.A. **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① Continuous miner sections produce 312 tons of coal per unit per shift. Twelve continuous miners purchased, 10 in use at any one time

(Bit. Coal 2.06MMTpy)

Indirect Costs

Labor, Management, Supervision, Clerical $0.41

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance -$1.06

Union Welfare, etc. -$1.05

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

indirect cost -$0.67

Direct Operating Costs

Production Labor -$1.97

Maintenance Labor - $0.28

Operating Supplies, Powder, Steel -$1.84

Utilities -$0.26

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) - $0.40 (taxes and insurance)

Depreciation - $0.85

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Bit Coal 2.06MM tpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Development cost - $8.01/ton
total - $9,164,000
tonnage - 1,143,400

Total capital investment - $64,154,900
(including $3,998,100 working capital)

(Bit Coal 1.05 MMtpy

MINING COST

MINERAL: Bituminous Coal

YEAR: 1975

State: N.A

District or County: N.A

Economic Availability Study

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8689

Type of Deposit:
48-inch coal bed

Mining Method: Main entries along the center axis of the property, with production headings on the right and left.

Tonnage: 1.03 million tpy

No. of Employees: 257

Tons per Man-shift: ①

Miners Wages per time period: $47.03 - $55.00 /shift

Direct Mining Costs per ton $4.51

Indirect Mining Costs per ton $3.52

Fixed Costs per ton $1.49

Capitalization Costs per ton . . . . N.A. (see attached sheet)

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $9.52

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $9.52

Market: N.A

Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

(1) Continuous miner sections produce 312 tons of coal per unit per shift. Six continuous miners purchased, 5 in use at any time

(Bit. Coal 1.03MMtpy)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.56

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $1.17

Union Welfare, etc. - $1.07

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A

indirect cost - $0.72

Direct Operating Costs

Production Labor - $2.05

Maintenance Labor - $0.32

Operating Supplies, Powder, Steel - $1.84

Utilities - $0.30

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) - $0.46 (taxes and insurance)

Depreciation - $1.03

Interest N.A

General Management N.A

Selling, Marketing N.A

(B.T. Coal Summary)

In

Capital Costs

- Working Capital
- Purchase Cost
- Capitalization of Exploration and Development
- Roads and other local construction
- Capitalization of Equipment
- Capitalization of Plant

Development cost - $8.91/ton
total - $5,385,300
tonnage (development) - 604,400

Total capital investment - $92,984,300
(including $5,870,400 working capital)

(Bit. Coal Interior Province)

MINING COST DATA

MINERAL: Bituminous Coal

YEAR: 1975

State: Interior Province

District or County: N.A.

Economic Availability Study.

Mine: Unnamed

Owner or Operator: N.A

Source of Information: I.C. 8703

Type of Deposit:
6ft coal bed with a 70 ft average overburden.

Mining Method: Strip mine

Tonnage:
6.72 million Tpy

No. of Employees: 184

Tons per Man-shift: N.A.

Miners Wages per time period:
$45.65 - $55.00 / shift

Direct Mining Costs per ton $1.08

Indirect Mining Costs per ton $1.71

Fixed Costs per ton $0.99

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton $0.04

Total Mining costs per ton (excluding Milling) . . . $3.82

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $3.82

Market: N.A

Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

Indirect Costs

Labor, Management, Supervision, Clerical - $0.06

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.14

Union Welfare, etc. - $0.78

Medical and Life Insurance N.A.

Royalties - $0.50

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs

Strip Lisence and bond - $0.09

Indirect cost - $0.14

Direct Operating Costs

Production Labor - $0.21

Maintenance Labor - $0.09

Operating Supplies, Powder, Steel - $0.60

Utilities - $0.18

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (~~Severance~~) - $0.22 (Taxes and insurance)

Depreciation - $0.77

Interest N.A.

General Management N.A

Selling, Marketing N.A

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total Capital Investment - $109,378,500 (includes working capital of $2,794,200)

(Bit. Coal, Northern Great Plains Province)

MINING COST DATA

MINERAL: Bituminous Coal

YEAR: 1975

State: Northern Great Plains Province

District or County: N.A

Economic Availability Study

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8703

Type of Deposit:
25 ft. seam of coal with an average overburden of 70 ft.

Mining Method: Open Pit

Tonnage: 9.2 million tpy

No. of Employees: 213

Tons per Man-shift: N.A.

Miners Wages per time period: $45.65 - $55.00 /shift

Direct Mining Costs per ton	$0.82
Indirect Mining Costs per ton	$1.27
Fixed Costs per ton	$0.48
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	$0.04
Total Mining costs per ton (excluding Milling) . . .	$2.61
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$2.61

Market: N.A

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

(Bit. Coal, Northern Great Plains Province)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.04

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.11

Union Welfare, etc. - $0.77

Medical and Life Insurance N.A.

Royalties - $0.24 (includes strip license and rent)

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs

indirect cost - $0.11

Direct Operating Costs

Production Labor - $0.17

Maintenance Labor - $0.08

Operating Supplies, Powder, Steel - $0.45

Utilities - $0.12

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes ~~(Severance)~~ - $0.08 (Taxes and insurance)

Depreciation - $0.40

Interest N.A.

General Management N.A.

Selling, Marketing N.A

(Bit Coal, Northern Great Plains Province)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital investment - $78,543,500
(includes working capital of $2,806,500)

(Bit. Coal Eastern Province)

MINING COST DATA

MINERAL: Bituminous Coal

YEAR: 1975

State: Eastern Province

Economic Availability Study

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8703

Type of Deposit:
6 ft coal bed with overburden ranging from 0 to 100 ft. in thickness

Mining Method: Strip mine

Tonnage: 4.8 million tpy

No. of Employees: 178

Tons per Man-shift: N.A.

Miners Wages per time period: $45.65 - $55.00/shift

Direct Mining Costs per ton $1.39

Indirect Mining Costs per ton $1.83

Fixed Costs per ton $1.11

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton $0.04

Total Mining costs per ton (excluding Milling) . . . $4.37

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $4.37

Market: N.A

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

(Bit. Coal Eastern [illegible])

Indirect Costs

Labor, Management, Supervision, Clerical - #0.09

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - # 0.19

Union Welfare, etc. - $0.80

Medical and Life Insurance N.A

Royalties - #0.50

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs
strip lisence & bond - #0.07
Indirect cost - #0.18

Direct Operating Costs

Production Labor - #0.27

Maintenance Labor #0.12

Operating Supplies, Powder, Steel - #0.74

Utilities - $0.26

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (~~Severance~~) - #0.05 (Taxes and insurance)

Depreciation - #0.86

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Bit. Coal East [illegible])

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital investment - $86,959,900
(includes working capital of $2,472,500)

(3.0 MM tpy)

MINING COST DATA

MINERAL: Coal

YEAR: 1975-1976

State: N.A.

District or County: N.A

Mineral Availability [illegible]

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8715

Type of Deposit:

84 inch Coalbed

Mining Method: Longwall Mining

Tonnage: 3.0 MM tpy

No. of Employees: 366 ①

Tons per Man-shift: N.A.

Miners Wages per time period: $51.23-$59.52 /shift (day)

Direct Mining Costs per ton	$ 3.14
Indirect Mining Costs per ton	$ 2.48
Fixed Costs per ton	$1.56
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$7.18
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$7.18

Market: N.A

Distance to Market: N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

D Underground - 289
Outside - 21
Salaried - 56

366

(3.0 Mill T.)

Indirect Costs

Labor, Management, Supervision, Clerical — $0.31

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance — $0.63

Union Welfare, etc. — $1.04

Medical and Life Insurance N.A.

Royalties N.A

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A

Indirect costs - $0.50

Direct Operating Costs

Production Labor — $1.04

Maintenance Labor — $0.23

Operating Supplies, Powder, Steel — $1.72

Utilities — $0.15

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A

Other Fixed Taxes ~~(Severance)~~ — $0.36

Depreciation — $1.20

Interest N.A.

General Management N.A.

Selling, Marketing N.A

(3.0 MM tpy)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total Capital Investment and deferred investment - $94,234,700
(including $4,390,800 working capital)

(Coal 1.5 MM tpy)

MINING COST DATA

MINERAL: Coal

YEAR: 1975-1976

State: N.A

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8715

Type of Deposit:

34 inch coalbed

Mining Method: Longwall mining

Tonnage: 1.5 MM tpy

No. of Employees: 202 D

Tons per Man-shift: N.A

Miners Wages per time period: $51.23 - $59.52/shift (day)

Direct Mining Costs per ton $3.41

Indirect Mining Costs per ton $2.75

Fixed Costs per ton $1.77

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $7.93

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $7.93

Market: N.A

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① Underground: 150
Outside: 11
Salaried: 41
202

(Coal 1.5 MM tpy)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.45

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.71

Union Welfare, etc. - $1.04

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

indirect costs - $0.55

Direct Operating Costs

Production Labor $1.11

Maintenance Labor $0.21

Operating Supplies, Powder, Steel - $1.92

Utilities - $0.17

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.40 (taxes and insurance)

Depreciation - $1.37

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Case 1.5MM tpy)

Capital Costs

- Working Capital
- Purchase Cost
- Capitalization of Exploration and Development
- Roads and other local construction
- Capitalization of Equipment
- Capitalization of Plant

Total Capital Costs and deferred investment - $52,474,500
(including $2,445,900 working capital)

COPPER

(Copper 1,000 tpd)

MINING COST DATA

MINERAL: Copper **YEAR:** 1972

State: Alaska

District or County: Near M^c^Carthy, Alaska

Mine: Jumbo, Bonanza, Mother Lode & Erie Mines

Owner or Operator: Kennecott Copper Corp.

Source of Information: IC 8602 Mineral Feasibility Study

Type of Deposit:
High grade copper replacements in limestone and dolomite. The predominant mineral is chalcocite.

Mining Method: Shrinkage stope

Tonnage: 1,000 tpd **No. of Employees:** 148 ①

Tons per Man-shift: N.A **Miners Wages per time period:** $50.88/shift (day

Direct Mining Costs per ton $8.94

Indirect Mining Costs per ton $6.77

Fixed Costs per ton $4.62

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $20.33

Milling Costs per ton $10.45

Total Costs per ton including Mining & Milling . . . $30.78

Market: Mill **Distance to Market:** 2.75 miles

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:
Study concerning re-opening mining area closed in 1938

over↓

Include ½ of general administration and ½ of support facilities personnel

(Copper 1,000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.80

Mine Office, Warehouse - $1.15 (General Administration and Services)

Payroll Overhead - Social Security, Insurance - $2.70

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A.

Indirect Costs - $2.12

Direct Operating Costs

Production Labor - $4.13

Maintenance Labor - $1.63

Operating Supplies, Powder, Steel - $2.90

Utilities - $0.28

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes - $0.92

Other Fixed Taxes (~~Severance~~). - $0.92 (Taxes and insurance

Depreciation - $2.78

Interest N.A.

General Management N.A

Selling, Marketing N.A.

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other Local Construction

Capitalization of Equipment

Capitalization of Plant

Total capital required (in the [illegible]) = $31,555,5[illegible]

including $2,051,400 working capital)

(Copper 1,000 tpd

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital requirement (mine and mill) - $37,593,300 (including $2,051,400 working capital)

(Cu Arizona)

MINING COST DATA

MINERAL: Copper

YEAR: 1973

State: Arizona

District or County: Maricopa County

Mine: Unnamed

Mineral Availability Study

Owner or Operator: N.A.

Source of Information: IC 8656

Type of Deposit:
Several porphyry copper ore bodies in a zone 5 miles long and 1 mile wide. Disseminated copper occurs both in monzonite porphyry stocks and in ①

Mining Method: Open pit

Tonnage: 100,000 tpd

No. of Employees: 728 (mine & mill)

Tons per Man-shift: N.A.

Miners Wages per time period: $4.50/hr

Direct Mining Costs per ton $0.58

Indirect Mining Costs per ton $0.18

Fixed Costs per ton $0.27

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $1.03

Milling Costs per ton $1.58

Total Costs per ton including Mining & Milling . . . $2.61

Market: Mill

Distance to Market: On site

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks: over ↓

① the surrounding sedimentary rocks. Chalcopyrite is the primary copper mineral, but chalcocite enrichment also occurs.

Indirect Costs

[illegible]

[illegible]

[illegible] Social Security, Insurance - [illegible]

Union Welfare, etc. N/A

Medical and Life Insurance N/A

Royalties N/A

Pension Funds N/A

Severance Tax N/A

Rehabilitation Costs N/A

Direct Operating Costs

Production Labor — $0.10

Maintenance Labor - $0.07

Operating Supplies, Powder, Steel - $0.39

Utilities - $0.02

Transportation Mine to Mill N/A

Freight, Supplies Delivered N/A

Future Development Costs N/A

Maintenance and Service of Equipment N/A

Fixed Costs

Property Taxes - $0.04

Other Fixed Taxes ([illegible]) - $[illegible]

Depreciation - $0.19

Interest N/A

General Management N/A

Selling, Marketing N/A

(Cu Arizona)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.08

Mine Office, Warehouse – $0.03 (General overhead)

Payroll Overhead - Social Security, Insurance - $0.07

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor – $0.10

Maintenance Labor - $0.07

Operating Supplies, Powder, Steel - $0.39

Utilities – $0.02

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes - $0.04

Other Fixed Taxes (~~Severance~~) - $0.04 (Taxes and insurance)

Depreciation – $0.19

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Cu Arizona)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

(Cu Alas

M COST DATA

MINERAL: Copper **YEAR:** 1973

State: Alaska

District or County: 12 miles North of Lake Clark

Mine: Unnamed

Mineral Availability Study

Owner or Operator: N.A.

Source of Information: IC 8656

Type of Deposit:
Several porphyry copper ore bodies in a zone 5 miles long and 1mile wide. Disseminated copper occurs both in monzonite porphyry stocks and in the surrounding

Mining Method: Open pit

Tonnage: 100,000 tpd

No. of Employees: 833 (mine & mill)

Tons per Man-shift: N.A.

Miners Wages per time period: $7.15/hr.

Direct Mining Costs per ton	$0.91
Indirect Mining Costs per ton	$0.31
Fixed Costs per ton	$0.37
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$1.59
Milling Costs per ton	$2.93
Total Costs per ton including Mining & Milling . . .	$4.52

Market: Mill

Distance to Market: On site

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① sedimentary rocks. Chalcopyrite is the primary copper mineral, but chalcocite enrichment also occurs.

(Cu Alaska)

Indirect Costs

Labor, Management, Supervision Clerical – $0.15

Mine Office, Warehouse – $0.05 (General overhead)

Payroll Overhead - Social Security, Insurance – $0.11

Union Welfare, etc. N.A.

Medical and Life Insurance, N.A.

Royalties N.A.

Pension Funds, N.A.

Severance Tax N.A.

Rehabilitation Costs, N.A.

Direct Operating Costs

Production Labor – $0.16

Maintenance Labor – $0.16

Operating Supplies, Powder, Steel – $0.48

Utilities – $0.04

Transportation Mine to Mill N.A.

Freight, Supplies Delivered, N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment, N.A.

Taxable subsidies - $0.07

Fixed Costs

Property Taxes – $0.06

Other Fixed Taxes (~~Severance~~) $0.06 (Taxes and insurance)

Depreciation – $0.25

Interest, N.A.

General Management, N.A.

Selling, Marketing N.A.

(Cu Alaska)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital requirements - $50,000,500

MINING COST DATA

MINERAL: Copper

YEAR: 1958

State: Arizona

District or County: Gila County

Mine: Miami Mine

Owner or Operator: Miami Copper Co.

Source of Information: IC 8271

Type of Deposit:
Pinal schist and a porphyritic border facies of the Schultze granite stock. East of Pinal Creek, the lodes are generally fissure veins. West of Pinal creek ①

Mining Method: block-caving

Tonnage: 3,812,165 (1956)

No. of Employees: N.A.

Tons per Man-shift: 72 tons

Miners Wages per time period: $18.86 /shift (1957)

Direct Mining Costs per ton . . . .
Indirect Mining Costs per ton . . . .
Fixed Costs per ton . . . .
Capitalization Costs per ton . . . .
Cost of Rehabilitation per ton . . . . } $3.505

Total Mining costs per ton (excluding Milling) . . . $3.505

Milling Costs per ton $1.095

Total Costs per ton including Mining & Milling . . . $4.60

Market: Mill

Distance to Market: On site

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

emarks:
Also, incentive-bonus program used

over ↓

Concentrating costs or total cost

price of Cu in [illegible] = $0.40/lb

12,000 tons of ore $\left(\frac{11.5 \text{ lb}}{\text{Ton}}\right)$ = 138,000 lb Cu

138,000 lb Cu ($0.40/lb) = $55,200

assume breakeven

$\frac{\$55,200}{12,000} = \$4.60/\text{ton}$

Milling : 23.8% = $4.60 (0.238) = $1.095

① the ore bodies were generally disseminated or porphyry type associated with igneous intrusions.

Indirect Costs N.A.

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs N.A

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total Cost of producing copper

Mining	38.5%
Concentrating	23.8%
Smelting, refining etc.	23.2%
General	11.6%
Legal & Admin	2.9%

TABLE 24. - Mining costs

	Percent
Amortization of preliminary development	-
Remaining development (stope preparation)	16.5
Operating stoping	44.0
Electric haulage	16.9
General underground	5.3
Mine ventilation	6.5
Underground lighting	0.4
Hoisting	4.4
Engineering and sampling	2.0
Mine surface expense	4.0
Total mining	100.0

TABLE 25. - Concentrating costs

	Percent
Coarse crushing and conveying	20.7
Grinding	33.3
Flotation	15.4
Water	8.8
Concentrate disposal	4.4
Tailings disposal	5.2
Sampling	1.5
Experimental	0.5
General mill	10.2
Total concentrating	100.0

TABLE 26. - Total cost of producing copper

	Percent
Mining	38.5
Concentrating	23.8
Smelting, refining, etc	23.2
General	11.6
Legal and administrative	2.9
Total	100.0

Total cost in table 26 does not include credit to the copper account for molybdenum sold, which amounted to about 2.7 percent of the total cost. Also, it should be noted that no allowance has been made for amortization of preliminary development for mine and plant, as these charges had been completely written off. The listed costs are based on a period during which the mine produced at a daily rate of about 12,000 tons of ore that contained 11 to 12 pounds of recoverable copper.

MINING COST DATA

MINERAL: Copper

YEAR: 1957

State: Nevada

District or County: White Pine

Mine: Tripp Pit

Owner or Operator: Consolidated Coppermines Corp.

Source of Information: IC 8129

Type of Deposit:

Chalcocite in limestones, quartzites and shales. Chalcocite occurs as minute specks replacing grains of pyrite and chalcopyrite and also as films①

Mining Method: Open pit

Tonnage: 14,676,988 (1957) (11,971,433 waste)

No. of Employees: 300

Tons per Man-shift: 395.9 Tons

Miners Wages per time period: $1.975 - $2.695/hr

Direct Mining Costs per ton $0.1685

Indirect Mining Costs per ton $0.0367

Fixed Costs per ton $0.0454

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $0.2506

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $0.2506

Market: Mill

Distance to Market: N.A

Haulage Costs: $0.0737/ton (included in DC)

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

①surrounding grains of these minerals-

Indirect Costs

Labor, Management, Supervision, Clerical - $0.0367

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor $0.0074

Maintenance Labor - $0.0046

Operating Supplies, Powder, Steel 0.0163

Utilities 0.0021

Transportation Mine to Mill - $0.1092

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment $0.0133

General pit expense - $0.0124

Tipple - $0.0032

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) N.A

Depreciation $0.0454 (includes amortization)

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

Capital Costs

Working Capital N.A.

Purchase Cost N.A.

Capitalization of Exploration and Development N.A.

Roads and other local construction N.A

Capitalization of Equipment N.A.

Capitalization of Plant N.A.

MINING COST DATA

MINERAL: Copper

YEAR: 1958

State: Arizona

District or County: Gila County

Mine: Inspiration Mine

Owner or Operator: Inspiration Consolidated Copper Co.

Source of Information: IC 8154

Type of Deposit:
Sulfide minerals of copper, iron, and molybdenum were deposited in the prophyritic border facies of the granite, in quartz monzonite and Pinal schist ①

Mining Method: Open pit and underground

Tonnage: 10,193,281 (1958)

No. of Employees: 160 (mine & mine shops)

Tons per Man-shift: N.A.

Miners Wages per time period: N.A.

Direct Mining Costs per ton . . . . 93.81% of TC

Indirect Mining Costs per ton . . . . 6.19% of TC

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 100.00% of TC

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . 100.00% of TC

Market: Mill

Distance to Market: 1 mile

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

See attached sheet, table 9

① The primary sulfide minerals are pyrite, chalcopyrite and molybdenite. Non sulfide copper minerals are malachite, azurite, chrysocolla, cuprite and native copper. The gangue consists of quartz, sericite and clay minerals.

Indirect Costs

Labor, Management, Supervision, Clerical N.A.

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A.

Breaking ground - 6.09 % of TC

Prospect drilling - 0.10 % of TC

Direct Operating Costs

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

93.81% of TC

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs U.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

TABLE 9. - Cost distribution for open-pit mine on a percentage basis.

	Surface only	Surface and underground
Blasthole drilling....................	3.35	2.80
Pneumatic drilling....................	0.29	0.24
Primary blasting......................	3.63	3.05
Breaking ground.......................	7.27	6.09
Secondary blasting....................	0.06	0.04
Shovel loading........................	16.44	13.77
Truck haulage.........................	53.11	44.52
Waste dump maintenance................	3.06	2.56
Miscellaneous.........................	15.28	12.81
Moving material by tractors and scraper......................	4.67	3.92
Total..........................	92.67	77.62
Prospect drilling.....................	0.11	0.10
Underground ore handling..............	-	16.19
Total surface operations........	100.0	-
Total open-pit operations.......	-	100.00

TABLE 10. - Content of leach-in-place solutions, grams per liter

	Solution to area	Solution to iron launder	Solution off iron launder
Copper..........	0.04	1.50	0.01
Sulfuric acid...	3.20	1.00	[1] Nil
Ferrous iron....	0.58	1.02	3.30
Ferric iron.....	0.42	0.46	Nil

[1] pH 3.5

TABLE 11. - Typical water data.

Year	1957		1958		1959	
	Gallons per ton of ore	Percent of total	Gallons per ton of ore	Percent of total	Gallons per ton of ore	Percent of total
resh water............	8	3.6	3	1.4	3	1.5
resh water overflow...	-	-	-	-	1	0.4
eservoir water........	155	68.4	167	73.9	163	72.8
ailings dam water.....	64	28.4	56	24.7	57	25.3
Total............	227	100.0	226	100.0	224	100.0

FIGURE 41. - Revised Mill.

MINING COST DATA

MINERAL: Copper **YEAR:** 1959

State: Arizona

District or County: Gila County

Mine: Inspiration Mine

Owner or Operator: Inspiration Consolidated Copper Co.

Source of Information: IC 8154

Type of Deposit:
Sulfide minerals of copper, iron, and molybdenum deposited in the porphyritic border facies of the granite, quartz monzonite and fissile Pinal schist. Erosion has produced oxide deposits in the ①

Mining Method: All open pit after 1954

Tonnage: 5,028,661 (1959) **No. of Employees:** 48

Tons per Man-shift: 350 tons **Miners Wages per time period:** N.A

Direct Mining Costs per ton . . . . 100% of TC (see attached sheets)

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 100% of TC

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . 100% of TC

Market: Crushing plant **Distance to Market:** on site

Haulage Costs: 62.21% of TC (includes shovel loading)

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

D area. The principal primary sulfide minerals are pyrite, calcopyrite and molybdenite. The nonsulfide copper minerals are malachite, azurite, chrysocolla, cuprite, and native copper.

Indirect Costs N.A.

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs Costs not broken down into labor and materials

Production Labor N.A

Maintenance Labor N.A

Operating Supplies, Powder, Steel N.A

Utilities N.A

Transportation Mine to Mill - 62.21 % of TC

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment - 2.56% of TC

Blasting & drilling - 12.32 % of TC

Ore handling (underground) - 10.10% of TC

miscellaneous - 12.81%

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

R

MINING COST DATA

MINERAL: Copper **YEAR:** 1959

State: Arizona

District or County: Pima County

Mine: Silver Bell Unit

Owner or Operator: American Smelting and Refining Co.

Source of Information: IC 8153

Type of Deposit:
The two ore deposits being currently exploited are tabular bodies of chalcocite ore, 2 miles apart. The Oxide ore body is is saucer shaped ①

Mining Method: Open pit

Tonnage: 4,387,030 tons (1959) **No. of Employees:** 220

Tons per Man-shift: 5,803 tons per shovel shift

Miners Wages per time period: N.A.

Direct Mining Costs per ton . . . . 17.36% of TC

Indirect Mining Costs per ton . . . . 34.18% of TC

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 51.54% of TC

Milling Costs per ton . . . . 48.46% of TC

Total Costs per ton including Mining & Milling . . . 100.00% of TC

Market: Crushing plant **Distance to Market:** 3600 ft.

Haulage Costs: 8.81 % of TC (included in direct cost)

Method of Waste Disposal: haul road subgrade, tailings dam

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① and varies in thickness from 100-200 ft beneath 100 feet of leaching cap. The dimensions are approximately 1500 ft by 2100 ft. The El Tiro ore body is elipsoid in shape but quite irregular in outline and cross section. The oxidized cap is 100-300 ft thick. The ore body is from 100 to 300 ft. thick. The dimensions are approximately 1,300-2,200 ft.

Indirect Costs

Labor, Management, Supervision, Clerical - 0.53% of TC

Mine Office, Warehouse N A

Payroll Overhead - Social Security, Insurance N A

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N A

Rehabilitation Costs N.A

Total indirect expense - 33.65 % of TC

Direct Operating Costs

Production Labor 1.921 % of TC

Maintenance Labor 0.486% of TC

Operating Supplies, Powder, Steel - 3.1% of TC

Utilities 0.433% of TC

Transportation Mine to Mill - 8.81 % of TC

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment - 1.27 % of TC

other direct expense - 1.34 % of TC

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

RECENT MINING COST DATA

Mineral: Copper   **Year:** 1947

State: New Mexico   **Mining Dist. or County:** Landsburg

Mine: Atwood

Owner: C. H. McIntosh

Type of Deposit: Chalcopyrite in vertical fissure veins in granodiorite, highly siliceous, less than 4 to 20' wide, aver. 5' wide, Cu. 2.3%, Pb 1.1%, Ag. 5.6 oz., Au. 0.06 oz.

Mining Method: Shrinkage

Type of Milling:

Tonnage: 2,000 T/mo.   **No. of Employees:**

Tons per man-shift: **Miners Wage:** $1.02/hr.

Exploration Costs per ton:	$ Not included in total
Development Costs per ton:	Included in total
Direct Mining Costs per ton:	Included in total
Indirect Costs per ton:	Included in total
Depreciation of Plant & Equipment per ton:	Included in total
Total Costs excluding milling costs (per ton):	$ 7.50 *
Milling Costs per ton:	
Total Costs including milling costs (per ton):	$

Source: USBM IC 7502

Remarks: Walls stand well, sent to smelter as fluxing ore.

* Cost to deliver ore at R. R.

FLUORSPAR

RECENT MINING COST DATA

Mineral: Fluorspar **Year:** 1958

State: Illinois **Mining Dist. or County:** Hardin County

Mine: Crystal-Victory, Minerva No. 1

Owner: Minerva Oil Company

Type of Deposit: Fluorite in faults and replacement in limestone - also contains sphalerite. Ore bodies up to 3 miles long, 3-20' thick. Flat-bedded, lens-shaped deposits.

Mining Method: Open Stope with pillars

Type of Milling:

Tonnage: 8,000 T/mo. each mine **No. of Employees:**

Tons per man-shift: **Miners Wage:** $1.85 - $1.95 both mines

	Crystal-Victory	Minerva No.1
Exploration Costs per ton:	$	
Development Costs per ton:	Included	Included
Direct Mining Costs per ton:	$ 2.185 1/	$2.77 2/
Indirect Costs per ton:		
Depreciation of Plant & Equipment per ton:		
Total Costs excluding milling costs (per ton):		
Milling Costs per ton:		
Total Costs including milling costs (per ton):	$	

Source: USBM IC 7956

Remarks: 1/ Development estimated at 25% of total cost, labor 51%

2/ Labor 63%

MINING COST DATA

MINERAL: Fluorspar **YEAR:** 1958

State: Illinois

District or County: Hardin County

Mine: Minerva No. 1 mine

Owner or Operator: Minerva Oil Co.

Source of Information: IC 7956

Type of Deposit:
The ore occurs in limestone and is a fluorspar - sphalerite mixture. The sphalerite contains cadmium, germanium, and gallium. The ①

Mining Method: Open stope, breast stoping with random pillars

Tonnage: 23,963 tons (Jan-Mar 1958) **No. of Employees:** N.A.

Tons per Man-shift: 11.300 tons **Miners Wages per time period:** N.A.

Direct Mining Costs per ton	$2.869
Indirect Mining Costs per ton	$0.024
Fixed Costs per ton	N.A
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$2.893
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$2.893 ②

Market: Primary crusher **Distance to Market:** on site

Haulage Costs: $0.161/ton (included in mining costs)

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① deposits are lens shaped, flat-lying bedded deposits

② Labor is 57.02% of Total Cost
Explosives - 1.10 lbs/ton
Power - 14.20 kw-hrs/ton
Other supplies - 66.50% of total supplies and power
Supplies and power - 42.98% of total cost

Indirect Costs

Labor, Management, Supervision, Clerical - $0.024

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor

Maintenance Labor

$2.493

Operating Supplies, Powder, Steel N.A

Utilities N.A

Transportation Mine to Mill - $0.161

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment - $0.215

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Fluorspar YEAR: 1958

State: Illinois

District or County: Hardin County

Mine: Crystal-Victory Mine

Owner or Operator: Minerva Oil Co

Source of Information: IC 7956

Type of Deposit:
Alternate limestone, sandstone and shale beds. The mineral deposits were formed why the limestone was replaced selectively by hydrothermal solutions. The main mineral deposits are: fluorspar, sphalerite and galena, ①

Mining Method: Breast stoping (room and pillar)

Tonnage: 24,956 tons (Jan-Mar 1958) No. of Employees: N.A

Tons per Man-shift: 10.349 tons

Miners Wages per time period: $1.68-$2.00/hr ②

Direct Mining Costs per ton	$3.674
Indirect Mining Costs per ton	$0.055
Fixed Costs per ton	N.A
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$3.729
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling . . .	$3.729 ③

Market: Primary Crusher Distance to Market: N.A

Haulage Costs: $0.233/ton (included in mining costs)

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① with greenockite, gallium, and germanium sulfide as important components of the sphalerite

② +5¢/hr for second shift
+9¢/hr for third shift

③ Total Power - 12.30 kw-hr/ton
Other supplies - 72.95% of total power and supplies
Supplies and power - 50.11% of total cost.
Explosives - 1.25 lbs/ton
Labor is 49.89% of TC (total cost)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.055

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor
Maintenance Labor } $2.776

Operating Supplies, Powder, Steel N.A

Utilities N.A.

Transportation Mine to Mill - $0.773

Freight, Supplies Delivered N.A.

Future Development Costs - $0.031

Maintenance and Service of Equipment - $0.094

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

GOLD

MINING COST DATA

MINERAL: Gold **YEAR:** 1968

State: Colorado

District or County: Cripple Creek Mining District

Mine: Unnamed Engineering and Economic Model

Owner or Operator: N.A.

Source of Information: IC 8374

Type of Deposit:
Ore deposits occur chiefly in veins within the fragmented rocks and igneous intrusive bodies. Principal ore minerals are gold tellurides in association with quartz and ①

Mining Method: Open Pit

Tonnage: 37,333 tpd **No. of Employees:** 79

Tons per Man-shift: N.A. **Miners Wages per time period:** $4.50/hr - shovel operator

Direct Mining Costs per ton $1.14716

Indirect Mining Costs per ton $0.24020

Fixed Costs per ton $1.20797

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $2.59533

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $2.59533

Market: Mill **Distance to Market:** on site

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:
Three investment and cost summaries included in publication for the following assumptions: #1 - The ore is upgraded ②

① Fluorite along with lesser quantities of dolomite, pyrite, sphalerite, galena and tetrahedrite

② by a screening process which would reduce the mill feed by 50%. #2 - The low grade cyanide circuit was eliminated. #3 - A combination of the first two assumptions.

Indirect Costs

Labor, Management, Supervision, Clerical – $0.03972 (Annual wages)

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. – $0.12656 (Fringe Benefits)

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Contingency Fund - $0.07392

Direct Operating Costs

Production Labor } $0.32188 (hourly Wages)

Maintenance Labor

Operating Supplies, Powder, Steel } $0.82528 (Power & Supplies)

Utilities

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes } $0.45715

Other Fixed Taxes (~~Severance~~)

Depreciation – $0.75082

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital investment - $101,342,700
(including $6,369,000 working capital)

IRON

MINING COST DATA

MINERAL: Iron **YEAR:** 1957

State: Michigan

District or County: Marquette County

Mine: Greenwood Mine

Owner or Operator: Inland Steel Co.

Source of Information: IC 7971

Type of Deposit:
specular hematite and magnetite. Sediments lying on a rock complex of lower Precambrian igneous and metamorphic rocks.

Mining Method: Open, sublevel & shrinkage stoping

Tonnage: 67,072 **No. of Employees:** N.A

Tons per Man-shift: 4.37 **Miners Wages per time period:** N.A.

Direct Mining Costs per ton . . . . 78.66 % of TC

Indirect Mining Costs per ton . . . . 17.89 % of TC

Fixed Costs per ton . . . . 3.46% of TC ①

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . 100.00% of TC

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . 100.00% of TC (mining)

Market: smelter **Distance to Market:** N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A —

Method of Mined Land Rehabilitation: N.A

Remarks:
① Depletion & amortization not included

ndirect Costs

Labor, Management, Supervision, Clerical
Mine Office, Warehouse } 2.70

Payroll Overhead - Social Security, Insurance 0.36, 1.01, 2.26

Union Welfare, etc.- 4.73 „ 0.70

Medical and Life Insurance - 1.18 (employees group insurance)

Royalties - 2.86

Pension Funds - 2.08

Severance Tax N.A

Rehabilitation Costs N.A.

office charges - 0.01

Direct Operating Costs

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

} 78.66% of TC of mining

Fixed Costs

Property Taxes - 2.10 (real estate & personal property tax)

Other Fixed Taxes (Severance) - 0.03 (miscellaneous tax)

Depreciation - 1.33

Interest N.A.

General Management - covered in indirect costs

Selling, Marketing - N.A.

Capital Costs

Working Capital N.A

Purchase Cost N.A.

Capitalization of Exploration and Development N.A.

Roads and other local construction N.A

Capitalization of Equipment N.A.

Capitalization of Plant N.A.

MINING COST DATA

MINERAL: Iron YEAR: 1960

State: Michigan

District or County: Dickinson County

Mine: Groveland Mine

Owner or Operator: The Hanna Mining Co.

Source of Information: IC 8181

Type of Deposit:
hematite, magnetite, jasper, quartz and iron-rich silicates.
calcite and dolomite present in crosscutting veinlets.
Bedded ferruginous quartzite

Mining Method: Open pit

Tonnage: 28,000 tons / week

No. of Employees: 180①

Tons per Man-shift: ② 155.5 tons

Miners Wages per time period: NA

Direct Mining Costs per ton . . . . 14.62 % of TC

Indirect Mining Costs per ton . . . . 12.76 % of TC

Fixed Costs per ton . . . . 26.55 % of TC

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . 53.93 % of TC

Milling Costs per ton . . . . 46.07 % of TC

Total Costs per ton including Mining & Milling . . . 100.00 % of TC

Market: Mill

Distance to Market: 0.70 miles

Haulage Costs: 4.58 % of TC

Method of Waste Disposal: waste rock & overburden - dumped into nearby valley. Hydrated ores and conglomerate capping stockpiled for future use.

Method of Mined Land Rehabilitation:
N.A

Remarks:

over ↓

①	Open Pit	28
	Crushing Plant	20
	Concentration Plant	46
	Shops	47
*	Office & Supervision	39
		180

②	Open Pit	28
*	Chief mine clerk	1
*	Chief engineer	1
*	Pit foremen	2
*	Surveyor	1
*	Engineers helper	1
*	Geologists	2
		36

10 shifts / week , 36 people

3.6 men / shift

$$\frac{28,000 \text{ tons/week}}{10 \text{ shifts/week}} = \left(\frac{2800 \text{ tons}}{\text{shift}}\right)$$

$$\frac{2800 \text{ tons/shift}}{18 \text{ men/shift}} = 155.5 \text{ tons/man-shift}$$

Indirect Costs

Labor, Management, Supervision, Clerical -1.38% of TC (includes insurance)

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. - 4.14 % of TC (employee benefits)

Medical and Life Insurance N.A.

Royalties - 7.24 % of TC (includes commissions)

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor - 8.80% of TC (drilling, blasting, loading)

Maintenance Labor included in general mine expense

Operating Supplies, Powder, Steel — 1.24 % of TC (general mine expense)

Utilities N.A.

Transportation Mine to Mill - 4.58 % of TC

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes - 26.55 % of TC (depreciation and taxes)

Other Fixed Taxes (Severance) included in property taxes

Depreciation included in property tax

Interest N.A.

General Management Included in general mine expense

Selling, Marketing N.A.

Capital Costs

Working Capital N.A

Purchase Cost N.A

Capitalization of Exploration and Development N.A

Roads and other local construction N.A.

Capitalization of Equipment N.A

Capitalization of Plant N.A.

LEAD

(Pb 2,000 tpd)

MINING COST DATA

MINERAL: Lead **YEAR:** 1971

State: N.A.

District or County: N.A Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit:
The largest domestic lead resource is the Viburnum
Trend in southeast Missouri. Lead deposits are peripheral
to a structural dome of Precambrian rocks that
forms the St. Francois Mountains. Most of the lead ore is ①

Mining Method: Room and Pillar

Tonnage: 2000 tpd **No. of Employees:** N.A

Tons per Man-shift: N.A **Miners Wages per time period:** N.A

Direct Mining Costs per ton $2.063

Indirect Mining Costs per ton $1.700

Fixed Costs per ton $0.589

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $4.352

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $4.352

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

disseminated throughout favorable rocks in the predominantly dolomitic Cambrian Bonterre formation, forming laterally extensive replacement ore bodies that measure up to 200 ft. thick. Galena is the principal ore mineral, but sphalerite and chalcopyrite are important locally.

(Pb 2,000 tpd)

Indirect Co

Labor, Management, Supervision, Clerical - $0.318

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.430

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

General Costs - $0.952

Direct Operating Costs

Production Labor - $0.666

Maintenance Labor - $0.245

Operating Supplies, Powder, Steel - $1.038

Utilities - $0.114

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (~~Severance~~) - $0.136 (Taxes and insurance)

Depreciation - $0.453

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Pb 2,000 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total Capital cost - $2,616,691
(including $351,340 working capital)

(Pb 5,000 Tpd)

M. COST DATA

MINERAL: Lead

YEAR: 1971

State: N.A.

Mineral Availability Study

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit:
The largest domestic lead resource is the Viburnum Trend in southeast Missouri. Lead deposits are peripheral to a structural dome of Precambrian rocks that forms the St. Francois Mountains. Most of the lead ore is ①

Mining Method: Room and Pillar

Tonnage: 5,000 tpd

No. of Employees: N.A.

Tons per Man-shift: N.A.

Miners Wages per time period: N.A.

Direct Mining Costs per ton	$1.887
Indirect Mining Costs per ton	$1.457
Fixed Costs per ton	$0.365
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$3.709
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling . . .	$3.709

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① disseminated throughout favorable rocks in the predominantly dolomitic Cambrian Bonterre formation, forming laterally extensive replacement ore bodies that measure up to 200 ft. thick. Galena is the principal ore mineral, but sphalerite and chalcopyrite are important locally.

(Pb 5,000T pd)

Indirect Costs

Labor, Management, Supervision Clerical - $0.246

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance — $0.358

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

General costs - $0.853

Direct Operating Costs

Production Labor - $0.560

Maintenance Labor — $0.218

Operating Supplies, Powder, Steel — $1.008

Utilities - $0.101

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.084 (Taxes and insurance)

Depreciation - $0.281

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Pb 5,000 Tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital cost - #4,288,309
(including #778,375 working capital)

(Pb 150 tpd)

MINING COST DATA

MINERAL: Lead

YEAR: 1971

State: N.A.

District or County: N.A.

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit:
Vein type deposit, narrow, steeply dipping

Mining Method: Cut and fill

Tonnage: 150 tpd

No. of Employees: N.A

Tons per Man-shift: N.A.

Miners Wages per time period: N.A

Direct Mining Costs per ton $13.523

Indirect Mining Costs per ton $12.122

Fixed Costs per ton $2.969

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $28.614

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $28.614

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

(Pb cont')

Indirect Costs

Labor, Management, Supervision, Clerical - $2.421

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $3.323

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

General costs - $6.378

Direct Operating Costs

Production Labor - $5.803

Maintenance Labor - $1.269

Operating Supplies, Powder, Steel - $4.821

Utilities - $1.63 (Utilities and development)

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.685 (Taxes and insurance)

Depreciation - $2.284

Interest N.A

General Management N.A.

Selling, Marketing N.A.

(Pb 150 t/d)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital cost - $ 1,037,065
(including $180,631 working capital)

(Pb 500 tpd)

MINING COST DATA

MINERAL: Lead   **YEAR:** 1971

State: N/A

District or County: N.A.   Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit:
Vein type deposit, narrow, steeply dipping

Mining Method: Cut and fill

Tonnage: 500 tpd   **No. of Employees:** N.A.

Tons per Man-shift: N.A.   **Miners Wages per time period:** N.A.

Direct Mining Costs per ton	$10.981
Indirect Mining Costs per ton	$9.563
Fixed Costs per ton	$1.665
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$22.209
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$22.209

Market: Mill   **Distance to Market:** N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

(Pb 500 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $1.790

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $2.664

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

General Costs - $5.109

Direct Operating Costs

Production Labor - $4.950

Maintenance Labor - $0.870

Operating Supplies, Powder, Steel - $4.383

Utilities - $0.778 (Utilities and development)

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (~~Severance~~) - $0.384 (Taxes and Insurance)

Depreciation - $1.281

Interest N.A

General Management N.A

Selling, Marketing N.A

(Pb 500tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - $2,083,789
(including $482,385 working capital)

(Pb 1,000tpd)

MINING COST DATA

MINE: Lead

YEAR: 1971

State: N.A.

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8646

Type of Deposit:
Vein type deposit, narrow, steeply dipping

Mining Method: Cut and fill

Tonnage: 1,000 tpd

No. of Employees: N.A

Tons per Man-shift: N.A

Miners Wages per time period: N.A

Direct Mining Costs per ton	$10.081
Indirect Mining Costs per ton	$8.382
Fixed Costs per ton	$1.331
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$19.794
Milling Costs per ton	$3.720
Total Costs per ton including Mining & Milling . . .	$23.514

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

(Pb 1,000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical – $ 1.468

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $2.294

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A

General costs - $4.620

Direct Operating Costs

Production Labor – $4,379

Maintenance Labor - $0.707

Operating Supplies, Powder, Steel – $ 4.205

Utilities – $0.790 (Utilities and development)

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $ 0.307 (Taxes and insurance)

Depreciation – $ 1.024

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Pb 1,000 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

total capital costs - $3,426,235
(including $865,202 working capital)

(Pb 2,000 tpd)

MINING COST DATA

MINERAL: Lead

YEAR: 1971

State: N.A.

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: I C 8646

Type of Deposit:
Vein type deposit, narrow, steeply dipping

Mining Method: Cut and fill

Tonnage: 2000 tpd

No. of Employees: N.A

Tons per Man-shift: N.A.

Miners Wages per time period: N.A

Direct Mining Costs per ton	$9.645
Indirect Mining Costs per ton	$7.602
Fixed Costs per ton	$1.277
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$18.524
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$18.524

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks: N.A.

(Pb 2,000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $1.198

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $2.066

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

General Costs - $4.338

Direct Operating Costs

Production Labor - $4.039

Maintenance Labor - $0.666

Operating Supplies, Powder, Steel - $4.146

Utilities - $0.794 (Utilities and development)

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (~~Severance~~) - $0.295 (Taxes and insurance)

Depreciation - $0.982

Interest N.A.

General Management N.A.

Selling, Marketing N.A

(Pb 2,000 tpd)

Capital Costs

- Working Capital
- Purchase Cost
- Capitalization of Exploration and Development
- Roads and other local construction
- Capitalization of Equipment
- Capitalization of Plant

Total capital cost - #6,524,523
(including #1,613,833 working capital)

(Pb 250tpd)

MINING COST DATA

MINERAL: Lead

YEAR: 1971

State: N.A

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit: The largest domestic lead resource is the Viburnum Trend in southeast Missouri. Lead deposits are peripheral to a structural dome of Precambrian rocks that forms the St. Francois Mountains. Most of the lead ore i ①

Mining Method: Room and Pillar

Tonnage: 250 tpd

No. of Employees: N.A

Tons per Man-shift: N.A

Miners Wages per time period: N.A

Direct Mining Costs per ton . . . . $ 3.196

Indirect Mining Costs per ton . . . . $ 3.089

Fixed Costs per ton . . . . $ 2.906

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $9.191

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $9.191

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

disseminated throughout favorable rocks in the predominantly dolomitic Cambrian Bonneterre Formation, forming laterally extensive replacement ore bodies that measure up to 200 feet thick. Galena is the principal ore mineral, but sphalerite and chalcopyrite are important locally.

(Pb 500 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.730

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance — $0.788

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A.

General Costs - $1.571

Direct Operating Costs

Production Labor - $1.088

Maintenance Labor - $0.435

Operating Supplies, Powder, Steel - $1.241

Utilities - $0.432

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (~~Severance~~) - $0.671 (taxes and insurance)

Depreciation - $2.235

Interest N.A.

General Management N.A.

Selling, Marketing N.A

(Pb 500 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital cost - $1,470,811 (including $73,670 working capital)

(Pb, 1,000 tpd)

MINING COST DATA

MINERAL: Lead
YEAR: 1971

State: N.A.

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit:
The largest domestic lead resource is the Viburnum Trend in southeast Missouri. Lead deposits are peripheral to a structural dome of Precambrian rocks, that forms the St. Francois Mountains. Most of the lead ore is ①

Mining Method: Room and pillar

Tonnage: 1,000 tpd
No. of Employees: N.A.

Tons per Man-shift: N.A.
Miners Wages per time period: N.A

Direct Mining Costs per ton	$2.284
Indirect Mining Costs per ton	$2.022
Fixed Costs per ton	$0.949
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling)	$5.255
Milling Costs per ton	$3.72
Total Costs per ton including Mining & Milling	$8.975

Market: Mill
Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

disseminated throughout favorable rocks in the predominantly dolomitic Cambrian Bonterre Formation — forming laterally extensive replacement ore bodies that measure up to 200 ft. thick. Galena is the principal ore mineral, but sphalerite and chalcopyrite are important locally.

(Pb 1,000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.427

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.511

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

General costs - $1.084

Direct Operating Costs

Production Labor - $0.762

Maintenance Labor - $0.272

Operating Supplies, Powder, Steel - $1.082

Utilities - $0.168

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes ~~(Severance)~~ - $0.219 (taxes and insurance)

Depreciation - $0.730

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Pb 1,000 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital - #2,027,309
(including #201,368 working capital)

(Pb 500 tpd

MINING COST DATA

MINERAL: Lead

YEAR: 1971

State: N.A

District or County: N.A.

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8646

Type of Deposit:
The largest domestic lead resource is the Viburnum Trend in southeast Missouri. Lead deposits are peripheral to a structural dome of Precambrian rocks that forms the St. Francois Mountains. Most of the lead ore is ①

Mining Method: Room and Pillar

Tonnage: 500 tpd

No. of Employees: N.A

Tons per Man-shift: N.A

Miners Wages per time period: N.A

Direct Mining Costs per ton	$2.711
Indirect Mining Costs per ton	$2.732
Fixed Costs per ton	$1.507
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$6.95
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$6.95

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over↓

D disseminated throughout favorable rocks in the predominantly dolomitic Cambrian Bonneterre Formation, forming laterally extensive replacement ore bodies that measure up to 200 ft. thick. Galena is the principal ore mineral, but sphalerite and chalcopyrite are important locally.

(Pb 500 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.680

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance – $0.695

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

General costs - $1.357

Direct Operating Costs

Production Labor – $0.979

Maintenance Labor – $0.326

Operating Supplies, Powder, Steel – $1.142

Utilities - $0.264

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment , N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes ~~(Severance)~~ – $0.348 (Taxes and insurance)

Depreciation – $1.159

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Pb 500 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

total capital costs - $1,576,263
(including $127,717 working capital)

MINING COST DATA

MINERAL: Zinc-Lead YEAR: 1956

State: Washington

District or County: Stevens County

Mine: Deep Creek Zinc-Lead Mine

Owner or Operator: Goldfield Consolidated Mines Co.

Source of Information: IC 8174

Type of Deposit:
pale-yellow to dark-brown sphalerite found in small veinlets sparsely disseminated through the dolomite as a replacement deposit

Mining Method: Open stope long-hole inverted rill bench stoping

Tonnage: 79,580 (1956) No. of Employees: N.A.

Tons per Man-shift: 9.8 tons

Miners Wages per time period: comparable to other NW mining districts (non union)

Direct Mining Costs per ton $3.825

Indirect Mining Costs per ton $0.610

Fixed Costs per ton . . . . N.A. (partially covered in DC)

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $4.435

Milling Costs per ton $1.019

Total Costs per ton including Mining & Milling . . . $5.454

Market: Mill Distance to Market: 10 miles

Haulage Costs: $0.0501/ton-mile

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

Indirect Costs

Labor, Management, Supervision, Clerical $0.314

Mine Office, Warehouse - N.A.

Payroll Overhead - Social Security, Insurance - $0.127

Union Welfare, etc. N.A

Medical and Life Insurance - $0.077

Royalties N.A

Pension Funds N.A

Severance Tax - $0.092 (state tax)

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor $2.510 (includes core & blasthole drilling $0.755)

Maintenance Labor - $0.077

Operating Supplies, Powder, Steel - $0.585

Utilities - $0.249

Transportation Mine to Mill $0.404

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) N.A

Depreciation N.A

Interest N.A

General Management covered in indirect costs

Selling, Marketing N.A.

Capital Costs

Working Capital N.A.

Purchase Cost N.A.

Capitalization of Exploration and Development N.A.

Roads and other local construction N.A.

Capitalization of Equipment N.A.

Capitalization of Plant N.A

MINING COST DATA

MINERAL: Lead

YEAR: 1956

State: Missouri

District or County: Madison County

Mine: Madison Mine

Owner or Operator: National Lead Company

Source of Information: IC 8028

Type of Deposit:
A succession of sedimentary rocks consisting mostly of sandstone, dolomite, and interbedded shale which overlies basement rocks of granites, rhyolites and basic igneous rocks. The ore occurs in the dolomite

Mining Method: Open stope with natural pillar

Tonnage: 355,782 tons (1956)

No. of Employees: 81

Tons per Man-shift: 17.30 dry tons

Miners Wages per time period: ① $13.90 - $14.45/shift

Direct Mining Costs per ton $2.551

Indirect Mining Costs per ton $0.131

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $2.682

Milling Costs per ton $1.410

Total Costs per ton including Mining & Milling . . . $4.092

Market: Mill

Distance to Market: on site

Haulage Costs: $0.069/ton

Method of Waste Disposal: Tailings pond (after flotation)

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

daily bonus determined by the market price of lead. An incentive bonus system is used whereby employees performing certain kinds of work can increase their earnings by added effort and efficiency.

Indirect Costs

Labor, Management, Supervision, Clerical -$0.131

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor $1.12

Maintenance Labor

Operating Supplies, Powder, Steel $0.875

Utilities $0.029

Transportation Mine to Mill $0.069

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

general underground expense $0.458

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

RECENT MINING COST DATA

Mineral: Zinc-Lead **Year:** 1947

State: New Mexico **Mining Dist. or County:** Pinos Altos

Mine: Atlas No. 2

Owner: Andrew B. Stewart

Type of Deposit: Marmatite and galena replacement of limestone, 35' thick
10% Zn, 2.5% Pb, 3oz. Ag

Mining Method: Open Stope

Type of Milling: Flotation

Tonnage: 1500 T/mo. **No. of Employees:**

Tons per man-shift: 4.4 **Miners Wage:** 1.25/hr.

Exploration Costs per ton:.................................... $

Development Costs per ton:....................................

Direct Mining Costs per ton:.................................... 3.14

Indirect Costs per ton:....................................

Depreciate of Plant & Equipment per ton.................. ________

Total Costs excluding milling costs (per ton)............. $

Milling Costs per ton:.................................... 4.97 1/

Total Costs including milling costs (per ton)............ $

Source: USBM IC 7524

Remarks: Labor 61% Supplies and power 39%

1/ Includes haulage ($1.10), freight ($0.37), and custom milling ($3.50/ton)

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1956

State: Oklahoma

Mining Dist. or County: Tri-State

Mine: Piokee

Owner: Eagle-Picher Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 75' thick, 2.85% Zn, 0.57% Pb

Mining Method: Open Stope

Type of Milling:

Tonnage: 390 T/day

No. of Employees:

Tons per man-shift: 16.9

Miners Wage: 1.55/hr.

Exploration Costs per ton:..................................	$Included in Direct Mining
Development Costs per ton:..................................	0.12
Direct Mining Costs per ton:................................	1.88
Indirect Costs per ton:.....................................	Included in Direct Mining
Depreciation of Plant & Equipment per ton...................	Included in Direct Mining
Total Costs excluding milling costs (per ton)...............	$ 2.00
Milling Costs per ton:......................................	
Total Costs including milling costs (per ton):..............	$

Source: USBM IC 7930

Remarks: Regular tri-state district mining

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1957

State: Oklahoma

Mining Dist. or County: Tri-State

Mine: Piokee

Owner: Eagle-Picher Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 75' thick 2.85% Zn, 0.05% Pb.

Mining Method: Open Stope

Type of Milling:

Tonnage: 390 T/day

No. of Employees:

Tons per man-shift: 55.5

Miners Wage: $1.63/hr.

Exploration Costs per ton:	Not included
Development Costs per ton:	0.01
Direct Mining Costs per ton:	1.24
Indirect Costs per ton:	Included
Depreciation of Plant & Equipment per ton:	Included
Total Costs excluding milling costs (per ton):	1.25 *
Milling Costs per ton:	
Total Costs including milling costs (per ton):	

Source: USBM IC 7930

Remarks: Experimental mining using most modern equipment and bonuses

* Excluding exploration costs.

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1954-55

State: Illinois

Mining Dist. or County: Jo Daviess County

Mine: Gray

Owner: Tri-State Zinc, Inc.

Type of Deposit: Sphalerite and galena replacement in limestone, 60' thick

Mining Method: Open stope

Type of Milling: Jigging, flotation

Tonnage: 1,000 T/day

No. of Employees: 28

Tons per man-shift: 36.2

Miners Wage:

Exploration Costs per ton:	$ Included in totals
Development Costs per ton:	Included in totals
Direct Mining Costs per ton:	1.09
Indirect Costs per ton:	Not included in totals
Depreciation of Plant & Equipment per ton:	Not included in totals
Total Costs excluding milling costs (per ton).	$ 1.09
Milling Costs per ton:	0.78
Total Costs including milling costs (per ton):	$ 1.87

Source: USBM IC 7780

Remarks:

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1948

State: Idaho

Mining Dist. or County: Coeur d'Alene

Mine: Highland Surprise

Owner: Highland Surprise Consolidated Mining Co.

Type of Deposit: Sphalerite and galena, vertical veins, 2-25' wide

Mining Method: Shrinkage and cut and fill (below 700' level because of weak walls)

Type of Milling: Flotation

Tonnage: 275 T/day

No. of Employees:

Tons per man-shift: 3.5

Miners Wage:

Exploration Costs per ton:	$	Included in Direct Mining
Development Costs per ton:		Included in Direct Mining
Direct Mining Costs per ton:		6.74
Indirect Costs per ton:		General 0.75
Depreciation of Plant & Equipment per ton:		
Total Costs excluding milling costs (per ton)	$	7.49
Milling Costs per ton:		1.41
Total Costs including milling costs (per ton):	$	8.90

Source: USBM IC 7560

Remarks: 95% extraction

RECENT MINING COST DATA

Mineral: Zinc-Lead　　　**Year:** 1951

State: Idaho　　　**Mining Dist. or County:** Coeur d'Alene

Mine: Morning

Owner: American Smelting & Refining Co.

Type of Deposits: Sphalerite and galena in near vertical veins, Ore width 3-40'
5.7% Pb, 8.1% Zn, 2.0 oz. Ag

Mining Method: Stull set and fill

Type of Milling: Flotation

Tonnage: 320 T/day　　　**No. of Employees:**

ons per man-shift:　　　**Miners Wage:** $12.45/day

Exploration Costs per ton:	$	Not included in totals
Development Costs per ton:		Included in Direct Mining
Direct Mining Costs per ton:		18.72
Indirect Costs per ton:	) General	3.32
Depreciation of Plant & Equipment per ton:	)	
Total Costs excluding milling costs (per ton)	$	22.04*
Milling Costs per ton:		2.03
Total Costs including costs (per ton):	$	24.07*

Source: USBM IC 7743

Remarks: Heavy ground, ceased operation in 1953

Excluding exploration costs

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1955

State: Oklahoma

Mining Dist. or County: Tri-State

Mine: Rialto

Owner: American Zinc, Lead and Smelting Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 2.73% Zn, 0.21% Pb

Mining Method: Open Stope

Type of Milling:

Tonnage: 1,150 T/day

No. of Employees:

Tons per man-shift: 15.0

Miners wage: 1.50/hr.

Exploration Costs per ton:	$	Not included in Direct Mining
Development Costs per ton:		Not included in Direct Mining
Direct Mining Costs per ton:		1.76
Indirect Costs per ton:		Not included in Direct Mining
Depreciation of Plant & Equipment per ton:		Not included in Direct Mining
Total Costs excluding milling costs (per ton)	$	
Milling Costs per ton:		
Total Costs including milling costs(per ton)	$	

Source: USBM IC 7823

Remarks:

RECENT MINING COST DATA

Mineral: Zinc-Lead **Year:** 1954

State: Kansas **Mining Dist. or County:** Tri-State

Mine: Westside

Owner: Eagle-Picher Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 40-50' thick, 2.8% zn, 0.7% pb

Mining Method: Open Stope

Type of Milling:

Tonnage: 775 T/day **No. of Employees:** 30

Tons per man-shift: 22 Miners Wage: 1.40/hr.

Exploration Costs per ton:................................ $	Not included in Direct Mining
Development Costs per ton:................................	Not included in Direct Mining
Direct Mining Costs per ton:................................	1.27
Indirect Costs per ton:................................	Included in Direct Mining
Depreciation of Plant & Equipment per ton..................	Included in Direct Mining
Total Costs excluding milling costs (per ton).............. $	
Milling Costs per ton:................................	
Total Costs including milling costs (per ton):.............. $	

Source: USBM IC 7774

Remarks:

LIMESTONE

MINING COST DATA

MINERAL: Limestone

YEAR: 1960

State: Kansas

District or County: Pottawatomie, Morris, Dickinson

Mine: Bosse quarry, Hansen quarry, Huston quarry

Owner or Operator: Anderson - Oxandale Rock Co.

Source of Information: IC 8084

Type of Deposit: Limestone. Beds are locally flat lying, light buff and 6-10 ft. thick. Formations are thin bedded with many vertical crack. Overburden is unconsolidated residual material.

Mining Method: Open Pit

Tonnage: 89,862 tons

No. of Employees: 8-11

Tons per Man-shift: 42

Miners Wages per time period: $1.50 - $2.25/hr

Direct Mining Costs per ton . . . . $0.8074 ①

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $0.8074

Milling Costs per ton . . . . NA ②

Total Costs per ton including Mining & Milling . . . $0.8074

Market: Crusher

Distance to Market: on site

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

① Direct Costs exclusive of royalties, amortization, depreciation, insurance, salaries of management and office personnel, over ↓

other overhead expenses.

Labor	45.93 % of TC
Power & supplies, explosives	11.59 % of TC
Total Power (hp-hr/ton)	
fuel (diesel & gas)	9.98 % of TC
Repair parts & other supplies	32.50 % of TC
	100.00% of TC

② Rock crushing is 21.52% of TC.

ndirect Costs

Labor, Management, Supervision, Clerical N.A.

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Direct Operating Costs per short ton

Production Labor }
Maintenance Labor } $0.3708

Operating Supplies, Powder, Steel $0.4366

Utilities N.A.

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) N.A.

Depreciation N.A.

Interest N.A.

General Management N.A

Selling, Marketing N.A

Capital Costs

Working Capital N.A

Purchase Cost N.A.

Capitalization of Exploration and Development N.A.

Roads and other local construction N.A.

Capitalization of Equipment N.A.

Capitalization of Plant N.A.

MINING COST DATA

MINERAL: Limestone YEAR: 1963

State: Iowa

District or County: Madison County

Mine: No name · Two crushed limestone quarries

Owner or Operator: Martin Marietta Corp. & Gendler Stone Products Co.

Source of Information: IC 8199

Type of Deposit: Limestone and shale. Sand, gravel, clay and boulders covered by recent alluvium and loess. The underlying formation consists of limestone, shale, sandstone and coal. The limestone bedding in the Martin Marietta①

Mining Method: Open pit

Tonnage: 100-200 tons/hr No. of Employees: N.A.

Tons per Man-shift: 95 tons Miners Wages per time period: N.A

Direct Mining Costs per ton . . . . 56% of TC

Indirect Mining Costs per ton . . . . N.A.

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 56% of TC

Milling Costs per ton . . . . 44% of TC

Total Costs per ton including Mining & Milling . . . 100% of TC

Market: Crushing plant Distance to Market: 3,000 ft.

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① quarry is from less than 1 inch to 10 inches in thickness. The formation mined by the Gendler Stone Products Co. is about 10 ft thick containing horizontal strata 3-6 inches thick

Indirect Costs - N.A.

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor } 21.0% of TC (includes supervision)

Maintenance Labor }

Operating Supplies, Powder, Steel - 21% of TC

Utilities - 9.0% of TC (fuel)

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

burden costs - 5%

Fixed Costs - N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs - N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Limestone **YEAR:** 1957

State: Virginia

District or County: Giles County

Mine: Kimballton Limestone Mine

Owner or Operator: Standard Lime and Cement Company

Source of Information: IC 8214

Type of Deposit:
Limestone of high purity. 25-70 ft. thick, contains 1.5% or less magnesium carbonate. The bed is overlain by a dark-gray, laminated, hard siliceous limestone.

Mining Method: Room and pillar

Tonnage: 412,303 tons (1957) **No. of Employees:** 32

Tons per Man-shift: 47.6 tons **Miners Wages per time period:** $1.675 - $1.98/hr.

Direct Mining Costs per ton . . . . 93.4% of TC

Indirect Mining Costs per ton . . . . 6.6% of TC

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 100.00% of TC

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . 100.00% of TC

Market: Primary Crusher **Distance to Market:** 1/2 mile

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

Indirect Costs

Labor, Management, Supervision, Clerical - 6.6% of TC

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor – 16.6 % of TC

Maintenance Labor - 5.1% of TC (less trucks, shovels, and bulldozers)

Operating Supplies, Powder, Steel - 23.9% of TC

Utilities – 13.8 % of TC (electricity)

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Truck, Shovel, bulldozer expense - 34.0% of TC (operating labor, repair labor, operating supplies, repair materials, depreciation)

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Limestone **YEAR:** 1961

State: Tennessee

District or County: Carter County

Mine: Watauga Quarry

Owner or Operator: Watauga Stone Co.

Source of Information: IC 8198

Type of Deposit:
A formation of high magnesian limestone with horizons of limestone and cherty dolomite. The formation is estimated to be 3,000 ft. thick. ①

Mining Method: Open pit (quarry)

Tonnage: 7,500 tons / week **No. of Employees:** 27

Tons per Man-shift: 55.6 tons **Miners Wages per time period:** N.A

Direct Mining Costs per ton . . . . 51.9% of total man hrs/ton

Indirect Mining Costs per ton . . . . 14.9% of total man hrs/ton

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 66.7% of total man hrs/ton

Milling Costs per ton . . . . 33.3% of total man hrs/ton

Total Costs per ton including Mining & Milling . . . 100.00% of total man hrs/ton

Market: Crushing/Processing Plant **Distance to Market:** on site

Haulage Costs: 14.9% of total man hrs/ton (included in DC)

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

① The limestone in the quarry is dark grey to black. The mineable thickness probably exceed 250 ft. The overburden is 8-10 ft of weathered limestone and clay.

Indirect Costs

Labor, Management, Supervision, Clerical – 14.8% of Total man hrs/ton

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor – 25.9% of Total man hours/ton

Maintenance Labor – 11.1% of Total man hours/ton

Operating Supplies, Powder, Steel N.A

Utilities – 10.39 horsepower/ton

Transportation Mine to Mill – 14.9% of total man hrs/ton

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

RECENT MINING COST DATA

Mineral: Limestone　　Year: 1955

State: Virginia　　Mining Dist. or County: Scott County

Mine: Sunbright

Owner: Foote Mineral Co.

Type of Deposit: High purity oolitic limestone, up to 32' thick 9.% Ca CO3 $2\frac{1}{4}$% or less Mg CO_3.

Mining Method: Open Stope

Type of Milling: Crushed

Tonnage: 770 T/day　　No. of Employees: 25

Tons per man-shift: 37.1　　Miners Wage: 1.63/hr.

Exploration Costs per ton:	$ Not included in totals
Development Costs per ton:	Not included in totals
Direct Mining Costs per ton:	0.73
Indirect Costs per ton:	Included
Depreciation of Plant & Equipment per ton:	0.33
Total Costs excluding milling costs (per ton):	1.06 1/
Milling Costs per ton:	0.15
Total Costs including milling costs (per ton):	$ 1.21

Source: USBM IC 7793

Remarks: On R. R., 70% extraction

1/ Does not include exploration and development costs.

MANGANESE

MINING COST DATA

MINERAL: Manganese **YEAR:** 1959

State: Arkansas

District or County: Batesville District, Independence County

Mine: Miller - McGee Corp. Mine

Owner or Operator: Miller - McGee Corp.

Source of Information: IC 8095

Type of Deposit:
Irregularly distributed deposits of secondary manganese oxides in residual clays resulting from the weathering of Cason shale and Fernvale limestone

Mining Method: Underground

Tonnage: 590 tons (Jan 1 - June 30, 1959) **No. of Employees:** 21

Tons per Man-shift: **Miners Wages per time period:** $1.00-$1.50/hr

Direct Mining Costs per ton $34.53

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $34.53

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $34.53

Market: Washer Plant **Distance to Market:** 3 miles

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

see attached sheets

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor - $32.55 - Labor

Maintenance Labor } $1.98 (Supplies and repairs)

Operating Supplies, Powder, Steel }

Utilities N.A

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

- Working Capital
- Purchase Cost
- Capitalization of Exploration and Development
- Roads and other local construction
- Capitalization of Equipment
- Capitalization of Plant

TABLE 4. - Summary of production

Company	Dry long tons shipped	Period covered	Mining method
Leonard Baxter........................	3,520	Jan. 1 - Dec. 31, 1958	Open pit and underground
Arkansas Mining and Exploration Corp...	650	Jan. 1 - June 30, 1959	..........Do............
Miller-McGee Corp.....................	590	Jan. 1 - June 30, 1959	Underground

TABLE 5. - Costs per dry long ton shipped

	Leonard Baxter			Arkansas Mining and Exploration Corp.			Miller-McGee Corp.		
	Labor[1]	Supplies and repairs	Total	Labor[1]	Supplies and repairs	Total	Labor[1]	Supplies and repairs	Total
Stripping.............	$ 1.56	$ 9.97	$11.53	$ 5.64	$19.74	$25.38	-----	-----	-----
Mining................	31.64	1.36	33.00	20.39	2.00	22.39	$31.97	$0.82[1]	$32.79
Hauling...............	1.40	2.57	3.97	2.74	1.60	4.34	.35	.79	1.14
Washing...............	.51	.51	1.02	.60	.70	1.30	(2)	(2)	------
Churn drilling........	1.14	.25	1.39	-----	-----	-----	.23	.12	.35
Sample analyses........	-----	.65	.65	-----	.30	.30	-----	.25	.25
Total..............	$39.25	$15.31	$51.56	$29.37	$24.34	$53.71	$32.55	$1.98	$34.53

[1] Industrial insurance included, but not supervision.
[2] Cost of washing included in mining.

TABLE 6. - Costs in units of labor per man-hour per dry long ton mined[1] [2]

	Leonard Baxter	Arkansas Mining and Exploration Corp.	Miller-McGee Corp.
Stripping.............	1.06	2.92	-----
Mining................	20.68	16.82[3]	16.95[3]
Hauling...............	1.40	2.49	.32
Washing...............	.47	(3)	(3)
Churn drilling........	.82	-----	.43
Repair................	1.77	2.34	-----
Total.............	26.20	24.57	17.70

[1] Dry long tons per man shift was 0.305 at Leonard Baxter, 0.325 at Arkansas Mining and Exploration Corp., and 0.452 at Miller-McGee Corp.
[2] Summary of production given in table 4.
[3] Labor for washing in mining.

Miller-McGee Corp.

During the first 6 months of 1959, Miller-McGee Corp. mined from six shafts on the Diener tract and operated a washer in the NE¼NE¼ sec. 21, T. 14 N., R. 6 W., Independence County (fig. 1). The shafts were sunk prior to 1959 and, according to estimates, averaged 65 feet in depth. Production for the 6 months was 590 dry long tons of manganese ore. The ratio of the amount of direct shipping ore to that obtained from washing is not available.

The Diener tract was explored by churn drilling; found manganese deposits were developed by, and mined through, 4- by 4-foot cribbed shafts. The shafts were equipped with hoists and ventilating fans powered by small gasoline engines.

Transportation of wash dirt from mine to washer (4 miles), and ore from mine and washing plant to the railhead at Pfeiffer, was by 5-ton, end-dump trucks. The average haul from mine and washing plant to the railroad was 5 and 4 miles, respectively.

The washing plant used to upgrade wash dirt was equipped with a 15-cubic-yard wooden receiving hopper; a set of wrought-iron twin logs, 24 feet long, which were rotated by a 40-hp. gas engine; a picking belt 20 inches wide and 15 feet long; and a washed-ore bin. Water required for washing (450 to 500 gallons per minute) was piped about 500 feet from a nearby stream.

Operating costs for the first 6 months of 1959 are given in tables 5 and 6.

MINING COST DATA

MINERAL: Manganese YEAR: 1959

State: Arkansas

District or County: Batesville District, Independence County

Mine: Arkansas Mining and Exploration Corp Mine

Owner or Operator: Arkansas Mining and Exploration Corp

Source of Information: IC 8095

Type of Deposit:
Irregularly distributed deposits of secondary manganese oxides in residual clays resulting from the weathering of Cason shale and Fernvale limestone

Mining Method: Open pit and underground

Tonnage: 650 tons (Jan 1–June 30, 1959) No. of Employees: 13

ons per Man-shift: N.A. Miners Wages per time period: $1.00 – $1.50/hr

Direct Mining Costs per ton $53.71

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $53.71

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $53.71

Market: Washing Plant Distance to Market: on site

Haulage Costs: N.A

Method of Waste Disposal: N.A

thod of Mined Land Rehabilitation: N.A

Remarks:
see attached sheets

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor - $29.37 (Labor)

Maintenance Labor

} $24.34 (supplies & repair)

Operating Supplies, Powder, Steel

Utilities N.A

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

TABLE 4. - Summary of production

Company	Dry long tons shipped	Period covered	Mining method
Leonard Baxter......................	3,520	Jan. 1 - Dec. 31, 1958	Open pit and underground
Arkansas Mining and Exploration Corp...	650	Jan. 1 - June 30, 1959	..........Do...........
Miller-McGee Corp....................	590	Jan. 1 - June 30, 1959	Underground

TABLE 5. - Costs per dry long ton shipped

	Leonard Baxter			Arkansas Mining and Exploration Corp.			Miller-McGee Corp.		
	Labor[1]	Supplies and repairs	Total	Labor[1]	Supplies and repairs	Total	Labor[1]	Supplies and repairs	Total
Stripping.............	$ 1.56	$ 9.97	$11.53	$ 5.64	$19.74	$25.38	-----	-----	-----
Mining................	31.64	1.36	33.00	20.39	2.00	22.39	$31.97	$0.82[1]	$32.79
Hauling...............	1.40	2.57	3.97	2.74	1.60	4.34	.35	.79	1.14
Washing...............	.51	.51	1.02	.60	.70	1.30	([2])	([2])	------
Churn drilling........	1.14	.25	1.39	-----	-----	-----	.23	.12	.35
Sample analyses.......	-----	.65	.65	-----	.30	.30	-----	.25	.25
Total.............	$39.25	$15.31	$51.56	$29.37	$24.34	$53.71	$32.55	$1.98	$34.53

[1] Industrial insurance included, but not supervision.

[2] Cost of washing included in mining.

TABLE 6. - Costs in units of labor per man-hour per dry long ton mined[1] [2]

	Leonard Baxter	Arkansas Mining and Exploration Corp.	Miller-McGee Corp.
Stripping............	1.06	2.92	-----
Mining...............	20.68	16.82[3]	16.95[3]
Hauling..............	1.40	2.49	.32
Washing..............	.47	([3])	([3])
Churn drilling........	.82	-----	.43
Repair...............	1.77	2.34	-----
Total.............	26.20	24.57	17.70

[1] Dry long tons per man shift was 0.305 at Leonard Baxter, 0.325 at Arkansas Mining and Exploration Corp., and 0.452 at Miller-McGee Corp.
[2] Summary of production given in table 4.
[3] Labor for washing in mining.

Miller-McGee Corp.

During the first 6 months of 1959, Miller-McGee Corp. mined from six shafts on the Diener tract and operated a washer in the NE¼NE¼ sec. 21, T. 14 N., R. 6 W., Independence County (fig. 1). The shafts were sunk prior to 1959 and, according to estimates, averaged 65 feet in depth. Production for the 6 months was 590 dry long tons of manganese ore. The ratio of the amount of direct shipping ore to that obtained from washing is not available.

The Diener tract was explored by churn drilling; found manganese deposits were developed by, and mined through, 4- by 4-foot cribbed shafts. The shafts were equipped with hoists and ventilating fans powered by small gasoline engines.

Transportation of wash dirt from mine to washer (4 miles), and ore from mine and washing plant to the railhead at Pfeiffer, was by 5-ton, end-dump trucks. The average haul from mine and washing plant to the railroad was 5 and 4 miles, respectively.

The washing plant used to upgrade wash dirt was equipped with a 15-cubic-yard wooden receiving hopper; a set of wrought-iron twin logs, 24 feet long, which were rotated by a 40-hp. gas engine; a picking belt 20 inches wide and 15 feet long; and a washed-ore bin. Water required for washing (450 to 500 gallons per minute) was piped about 500 feet from a nearby stream.

Operating costs for the first 6 months of 1959 are given in tables 5 and 6.

MINING COST DATA

MINERAL: Manganese

YEAR: 1958

State: Arkansas

District or County: Batesville District, Independence County

Mine: Leonard Baxter Mine

Owner or Operator: Leonard Baxter Company

Source of Information: IC 8095

Type of Deposit: Irregularly distributed deposits of secondary manganese minerals in residual clays resulting from the weathering of Cason shale and Fernvale limestone

Mining Method: Open pit and underground

Tonnage: 3,520 (1958)

No. of Employees: 80

Tons per Man-shift: N.A.

Miners Wages per time period: $1.00 – $1.50/hr

Direct Mining Costs per ton $54.56

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $54.56

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $54.56

Market: Washing Plant

Distance to Market: 1 mile

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor – $39.25 (Labor)

Maintenance Labor } $15.31 (supplies & repairs)

Operating Supplies, Powder, Steel }

Utilities N.A

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

TABLE 4. - Summary of production

Company	Dry long tons shipped	Period covered	Mining method
Leonard Baxter......................	3,520	Jan. 1 - Dec. 31, 1958	Open pit and underground
Arkansas Mining and Exploration Corp...	650	Jan. 1 - June 30, 1959	..........Do...........
Miller-McGee Corp....................	590	Jan. 1 - June 30, 1959	Underground

TABLE 5. - Costs per dry long ton shipped

	Leonard Baxter			Arkansas Mining and Exploration Corp.			Miller-McGee Corp.		
	Labor[1]	Supplies and repairs	Total	Labor[1]	Supplies and repairs	Total	Labor[1]	Supplies and repairs	Total
Stripping.............	$ 1.56	$ 9.97	$11.53	$ 5.64	$19.74	$25.38	-----	-----	-----
Mining................	31.64	1.36	33.00	20.39	2.00	22.39	$31.97	$0.82[1]	$32.79
Hauling...............	1.40	2.57	3.97	2.74	1.60	4.34	.35	.79	1.14
Washing...............	.51	.51	1.02	.60	.70	1.30	(2)	(2)	------
Churn drilling........	1.14	.25	1.39	-----	-----	-----	.23	.12	.35
Sample analyses.......	-----	.65	.65	-----	.30	.30	-----	.25	.25
Total..............	$39.25	$15.31	$51.56	$29.37	$24.34	$53.71	$32.55	$1.98	$34.53

[1] Industrial insurance included, but not supervision.
[2] Cost of washing included in mining.

TABLE 6. - Costs in units of labor per man-hour per dry long ton mined[1] [2]

	Leonard Baxter	Arkansas Mining and Exploration Corp.	Miller-McGee Corp.
Stripping.............	1.06	2.92	-----
Mining................	20.68	16.82[3]	16.95[3]
Hauling...............	1.40	2.49	.32
Washing...............	.47	(3)	(3)
Churn drilling........	.82	-----	.43
Repair................	1.77	2.34	-----
Total..............	26.20	24.57	17.70

[1] Dry long tons per man shift was 0.305 at Leonard Baxter, 0.325 at Arkansas Mining and Exploration Corp., and 0.452 at Miller-McGee Corp.
[2] Summary of production given in table 4.
[3] Labor for washing in mining.

Miller-McGee Corp.

During the first 6 months of 1959, Miller-McGee Corp. mined from six shafts on the Diener tract and operated a washer in the NE¼NE¼ sec. 21, T. 14 N., R. 6 W., Independence County (fig. 1). The shafts were sunk prior to 1959 and, according to estimates, averaged 65 feet in depth. Production for the 6 months was 590 dry long tons of manganese ore. The ratio of the amount of direct shipping ore to that obtained from washing is not available.

The Diener tract was explored by churn drilling; found manganese deposits were developed by, and mined through, 4- by 4-foot cribbed shafts. The shafts were equipped with hoists and ventilating fans powered by small gasoline engines.

Transportation of wash dirt from mine to washer (4 miles), and ore from mine and washing plant to the railhead at Pfeiffer, was by 5-ton, end-dump trucks. The average haul from mine and washing plant to the railroad was 5 and 4 miles, respectively.

The washing plant used to upgrade wash dirt was equipped with a 15-cubic-yard wooden receiving hopper; a set of wrought-iron twin logs, 24 feet long, which were rotated by a 40-hp. gas engine; a picking belt 20 inches wide and 15 feet long; and a washed-ore bin. Water required for washing (450 to 500 gallons per minute) was piped about 500 feet from a nearby stream.

Operating costs for the first 6 months of 1959 are given in tables 5 and 6.

MINING COST DATA

MINERAL: Manganese　　**YEAR:** 1958

State: Arizona

District or County: Maricopa County

Mine: Black Rock Mine

Owner or Operator: Mohave Mining and Milling Co

Source of Information: IC 8144

Type of Deposit:
The ore body is a lenticular replacement of the tuffaceous matrix of the agglomerate and overlies gneiss. The principal manganese mineral Ⓒ

Mining Method: Open pit

Tonnage: 300 tons/day　　No. of Employees: 12

Tons per Man-shift: N.A.　　Miners Wages per time period: $1.80 - $3.00/hr

Direct Mining Costs per ton $3.31

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $3.31

Milling Costs per ton . . . . N/A

Total Costs per ton including Mining & Milling . . . $3.31

Market: Mill　　Distance to Market: 48 miles

Haulage Costs: $3.47/ton

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:
See attached sheet - table 10

① is ramsdellite, a manganese oxide (MnO_2) crystallizing in the orthorhombic system.

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor — $2.83

Maintenance Labor

Operating Supplies, Powder, Steel } $0.48

Utilities

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

period in 1958, when the mine was operating on one shift a day for 25 days a month and was producing an average of 300 tons of ore a day. Property tax, interest, depreciation, and depletion are not included.

TABLE 10. - Summary of open-pit mining costs
(Cost per ton of ore mined)

Item	Operating labor	Power, maintenance, and supplies	Total
Stripping....................	$1.56	$0.25	$1.81
Drilling and blasting.........	.75	.20	.95
Loading trucks................	.52	.03	.55
Engineer services.............	-	-	.04
Haulage to mill (48 miles)....	-	-	3.47
Total..................	-	-	6.82

Costs of labor, power, and supplies for concentrating 6,218 tons of ore in January 1959 by heavy media, tables, and flotation are summarized in table 11.

TABLE 11. - Distribution of milling costs, percent

Item	Labor		Power and supplies		Total
	Operating	Maintenance	Operating	Maintenance	
Crushing...............	3.2	0.7	2.5	0.7	7.1
Fine grinding..........	3.9	3.0	3.7	.8	11.4
Flotation..............	9.5	1.7	36.0	1.5	48.7
Heavy media............	3.2	1.1	2.2	.6	7.1
Tables.................	3.3	.7	.7	1.5	6.2
Yard work..............	1.2	1.8	3.2	4.3	10.5
Assaying...............	1.6	-	.7	-	2.3
Water supply...........	-	.2	-	.1	.3
Total............	25.9	9.2	49.0	9.5	93.6
Supervision............	6.4	-	-	-	6.4
Grand total.......	-	9.2	49.0	9.5	100.0

The company milled crude ore from approximately 225 different producers. These various types of ore necessitated different treatment methods or combination procedures, depending upon the grade and the physical characteristics of the manganese ores. The flotation cost figure was high because the reagent cost was about $4.60 per ton of ore. Average cost for custom-milling processing is shown on table 12.

MINING COST DATA

MINERAL: Manganese YEAR: 1959

State: Arizona

District or County: Maricopa County

Mine: Black rock mine

Owner or Operator: Mohave Mining and Milling Co.

Source of Information: IC 8144

Type of Deposit:
Principal manganese mineral is ramsdellite (MnO_2) Gangue is composed of unreplaced host rock and minor stringers of calcite and quartz.

Mining Method: Room and pillar for underground mining
open pit for surface mining.

Tonnage: 300 tons/day (1958) No. of Employees: 16

Tons per Man-shift: 18.75 tons

Miners Wages per time period: $1.80 - $3.00/hr

Direct Mining Costs per ton . . . . $6.82 (open pit)

Indirect Mining Costs per ton . . . . N.A.

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $6.82

Milling Costs per ton $3.80

Total Costs per ton including Mining & Milling . . . $10.62

Market: Mill Distance to Market: 48 miles

Haulage Costs: $3.47 (included in DC)

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor
Maintenance Labor } $2.83

Operating Supplies, Powder, Steel
Utilities } $0.48 (includes maintenance)

Transportation Mine to Mill - $3.47

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A
engineer services - $0.04

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MERCURY

MINING COST DATA

MINERAL: Mercury YEAR: 1959 (fiscal) ①

State: Alaska

District or County: Aniak district

Mine: Red Devil Mine

Owner or Operator: Alaska Mines and Minerals, Inc.

Source of Information: IC 8131

Type of Deposit:
The only sulfides found throughout the deposit are stibnite and cinnabar. The principal gangue material quartz and white clay. Country rock is well bedded, graded graywacke. The average strike is N. 38° W., dip, 63° S.

Mining Method: Stoping from top down, 3-6 ft. widths

Tonnage: 8,175.5 tons milled (FY 1959) No. of Employees: N.A.

Tons per Man-shift: N.A.

Miners Wages per time period: $2.00-$3.00/hr

Direct Mining Costs per ton $50.16

Indirect Mining Costs per ton $26.54

Fixed Costs per ton $19.22

Capitalization Costs per ton $26.07

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $121.99

Milling Costs per ton $13.74

Total Costs per ton including Mining & Milling . . . $135.73

Market: Mill (furnace) Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

① Data available for fiscal year 1958

ndirect Costs

Labor, Management, Supervision, Clerical - $7.72

Mine Office, Warehouse - included in maintainence

Payroll Overhead - Social Security, Insurance - $1.73

Union Welfare, etc. N.A

Medical and Life Insurance - $5.28 (includes workmen's compensation)

Royalties - $9.48

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Cost of registration, SEC - $2.33

Direct Operating Costs

Production Labor }
Maintenance Labor } $34.25

Operating Supplies, Powder, Steel - $4.54

Utilities - $4.00

Transportation Mine to Mill - $3.13

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment - $4.00

rebottling expense - $0.24

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) N.A

Depreciation - $11.56

Interest - $3.30

General Management N.A

Selling, Marketing - $4.36

Capital Costs

Working Capital N.A

Purchase Cost N.A

Capitalization of Exploration and Development - $26.01 (amortization)

Roads and other local construction N.A.

Capitalization of Equipment N.A

Capitalization of Plant N.A

Loss on sale of fixed assets - $0.06

MINING COST DATA

MINERAL: Mercury **YEAR:** 1959

State: California

District or County: Lake County

Mine: Abbott Mine

Owner or Operator: Cog Minerals Corp.

Source of Information: IC 8109

Type of Deposit:
serpentine breccia intrusive into shale and sandstone
dominant sulfides are marcasite c̄ cinnibar

Mining Method: Modified system of square set stoping

Tonnage: 10,952 tons (11 months) **No. of Employees:** 42①

Tons per Man-shift: ②
19.2 tons

Miners Wages per time period:
$15.60 - $21.00/8 hr day

Direct Mining Costs per ton $14.29

Indirect Mining Costs per ton . . . . $ 3.81

Fixed Costs per ton . . . . $ 3.71

Capitalization Costs per ton $3.85

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $25.66

Milling Costs per ton $5.51

Total Costs per ton including Mining & Milling . . . $31.17

Market: Mill **Distance to Market:** on site

Haulage Costs: Incorporated in mining costs.

Method of Waste Disposal: Used as road material

Method of Mined Land Rehabilitation: N.A.

Remarks:
① 42 employees/24 hrs

↓ over

① cont'd

	Personnel Men Per shift	Shifts	total Per 24hrs
Underground:			
Mine foreman	1	2	2
Miners	6	2	12
Helpers	6	2	12
Motorman	1	2	2
Surface:			
Timber framers	2	1	2
Mechanics	1	1	1
Electrician	1	1	1
Truck Driver	1	2	2
Miscellaneous	1	1	1
Mill			
Furnace men	2	3	6
Miscellaneous	1	1	1

②

$$\frac{10{,}956 \text{ tons}}{286 \text{ days}\left(\frac{2 \text{ shifts}}{\text{day}}\right)} = 19.2 \text{ tons}$$

Indirect Costs

Labor, Management, Supervision, Clerical - $3.23

Mine Office, Warehouse $0.58

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor $6.86

Maintenance Labor $0.89

Operating Supplies, Powder, Steel $3.21

Utilities $3.33

Transportation Mine to Mill N.A.

Freight, Supplies Delivered - Incorporated in various costs

Future Development Costs N.A.

Maintenance and Service of Equipment - Incorporated in various costs

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) N.A

Depreciation $1.04/ton, depletion $0.23/ton

Interest N.A.

General Management $1.87 (engineering & management)

Selling, Marketing $0.57

Capital Costs

Working Capital N.A

Purchase Cost N.A.

Capitalization of Exploration and Development $3.49/ton

Roads and other local construction N.A.

Capitalization of Equipment N.A

Capitalization of Plant N.A.

Amortization $0.36/ton

RECENT MINING COST DATA

Mineral: Mercury

Year: 1956

State: Idaho

Mining Dist. or County: Washington County

Mine: Idaho Almeden

Owner: Rare Metals Corporation of America

Type of Deposit: Cinnabar in silicified miocene sediments and volcanics.

Mining Method: Open pit

Type of Milling: Retorting

Tonnage: 160 T/day

No. of Employees: 16

[illegible]ns per man-shift: 13.8

Miners Wage:

Exploration Costs per ton:	$	Included in Direct Mining
Development Costs per ton:		0.13
Direct Mining Costs per ton:		0.71
Indirect Costs per ton:		0.21
Depreciation of Plant & Equipment per ton:		Not included in totals
Total Costs excluding milling costs (per ton):	$	1.05
Milling Costs per ton:		2.61
Total Costs including milling costs (per ton):	$	3.66

Source: USBM IC 7800

Remarks: Of total 36% is labor and 64% is supplies.

NICKEL

(Ni 200 tpd)

MINING COST DATA

MINERAL: Nickel **YEAR:** 1968

State: N.A.

District or County: N.A. Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite, and chalcopyrite and closely associated with norite and peridotite ①

Mining Method: Random room and pillar

Tonnage: 200 tpd **No. of Employees:** 10

Tons per Man-shift: N.A. **Miners Wages per time period:** $3.25/hr

Direct Mining Costs per ton	$1.810
Indirect Mining Costs per ton	$2.268
Fixed Costs per ton	$0.704
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$4.782
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling . . .	$4.782

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① (2) oxide deposits of nickeliferous laterite, occurring as weathering mantles atop serpentine or peridotite.

(Ni 200 tpa)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.760

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance – $0.460

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties NA.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Assay – $0.02

General cost – $1.028

Direct Operating Costs

Production Labor – $0.650

Maintenance Labor – $0.260

Operating Supplies, Powder, Steel – $0.80

Utilities – $0.100

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) – $0.162 (Taxes and insurance)

Depreciation – $0.542

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Ni 200tpd

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - $308,500
(including $38,000 working capital)

(Ni 400 tpd)

MINING COST DATA

MINERAL: Nickel

YEAR: 1968

State: N.A.

District or County: N.A.

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: I C 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite, and chalcopyrite and closely associated with norite and peridotite ①

Mining Method: Random room and pillar

Tonnage: 400 tpd

No. of Employees: 18

Tons per Man-shift: N.A

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton $1,810

Indirect Mining Costs per ton $1,832

Fixed Costs per ton $0.352

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $3.994

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $3.994

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

(1) (2) oxide deposits of nickeliferous laterite, occurring as weathering mantles atop serpentine or peridotite

(N, 400 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.500

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $0.388

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A

Assay · $0.020

General costs · $0.924

Direct Operating Costs

Production Labor - $0.650

Maintenance Labor - $0.260

Operating Supplies, Powder, Steel - $0.800

Utilities - $0.100

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes ~~(Severance)~~ - $0.081 (Taxes and insurance)

Depreciation - $0.271

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Ni 400 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs -- $338,500
(including $68,000 working capital)

(Ni 2,000 tpd

MINING COST DATA

MINERAL: Nickel **YEAR:** 1968

State: N.A.

District or County: N.A. Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite, and chalcopyrite and closely associated with norite and peridotite &

Mining Method: Random room and pillar

Tonnage: 2,000 tpd **No. of Employees:** 61

Tons per Man-shift: N.A. **Miners Wages per time period:** $3.25/hr

Direct Mining Costs per ton $1.470

Indirect Mining Costs per ton $1.325

Fixed Costs per ton $0.237

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $3.032

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $3.032

Market: Mill **Distance to Market:** N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

1) (2) oxide deposits of nickeliferous laterite, occurring as weathering mantles atop serpentine or peridotite

(Mill 2,000 t/d)

Indirect Costs

Labor, Management, Supervision, Clerical $0.338

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.254

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Assay - $0.010

General costs - $0.723

Direct Operating Costs

Production Labor - $0.429

Maintenance Labor - $0.156

Operating Supplies, Powder, Steel - $0.813

Utilities - $0.072

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.055 (taxes and insurance)

Depreciation - $0.1822

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Ni 2,000 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capitol costs - $1,170,000
(including $259,000 working capital)

(Ni 4000 tpd)

NING COST DATA

MINERAL: Nickel

YEAR: 1968

Mineral Availability Study

State: N.A.

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite and peridotite (2)

Mining Method: Random room and pillar

Tonnage: 4,000 tpd

No. of Employees: 105

Tons per Man-shift: N.A.

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton $1.383

Indirect Mining Costs per ton $1.106

Fixed Costs per ton $0.232

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $2.721

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $2.721

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

(Ni 4,000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.239

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.210

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Assay - $0.008

General costs - $0.649

Direct Operating Costs

Production Labor -- $0.397

Maintenance Labor - $0.130

Operating Supplies, Powder, Steel - $0.796

Utilities - $0.060

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.054

Depreciation - $0.178

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Ni 4,000 tpd)

C ital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - $2,244,000
(including $460,000 working capital)

(Ni 200 tpd

MINING COST DATA

MINERAL: Nickel

EAR: 1968

State: N.A.

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite and peridotite ①

Mining Method: Open pit

Tonnage: 200 tpd

No. of Employees: 4.

Tons per Man-shift: N.A.

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton	$0.800
Indirect Mining Costs per ton	$0.896
Fixed Costs per ton	$0.230
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$1.926
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling . . .	$1.926

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① (2) oxide deposits of nickeliferous laterite – occurring as weathering mantles atop serpentine or peridotite

(Ni 200tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $0.280

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance — $ 0.184

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A

General costs - $ 0.432

Direct Operating Costs

Production Labor
Maintenance Labor } $ 0.390

Operating Supplies, Powder, Steel - $ 0. 410

Utilities N.A.

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $ 0. 053 (Taxes and insurance)

Depreciation - $0. 177

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Ni 200t/d)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - $104,300
(including $15,800 working capital)

(Ni 400tpd

MINING COST DATA

MINERAL: Nickel

YEAR: 1968

State: N.A

Mineral Availability Study

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit: Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite and peridotite ②

Mining Method: Open Pit

Tonnage: 400 tpd

No. of Employees: 6

Tons per Man-shift: N.A.

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton $0.643

Indirect Mining Costs per ton $0.776

Fixed Costs per ton $0.177

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $1.596

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $1.596

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① (2) oxide deposits of nickeliferous laterite occurring as weathering mantles atop serpentine or peridotite

(Ni 400Tpd

Indirect Costs

Labor, Management, Supervision, Clerical - $0.260

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance - $0.143

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A.

Assay - $0.012

General costs $0.361

Direct Operating Costs

Production Labor
Maintenance Labor } $0.260

Operating Supplies, Powder, Steel - $0.368

Utilities - $0.015

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (Severance) - $0.041

Depreciation - $0.136

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Ni 400 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - #162,500
(including #26,500 working capital)

(Ni 2,000 tpd)

MINING COST DATA

MINERAL: Nickel

YEAR: 1968

State: N.A.

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite and peridotite or

Mining Method: Open pit

Tonnage: 2,000 tpd

No. of Employees: 14

Tons per Man-shift: N.A.

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton . . . . $ 0.364

Indirect Mining Costs per ton $0.373

Fixed Costs per ton $0.140

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $0.877

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $0.877

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① (2) oxide deposits of nickeliferous laterite occurring as weathering mantles atop serpentine or peridotite.

(Ni 2000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.114

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance – $0.064

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Assay - $0.004

General costs - $0.191

Direct Operating Costs

Production Labor
Maintenance Labor } $0.117

Operating Supplies, Powder, Steel $0.242

Utilities – $0.005

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) – $0.032 (Taxes and insurance)

Depreciation - $0.108

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Ni 2,000 tpd

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - $607,000
(including $68,000 working capital)

Total capital costs - $660,000
(including $68,000 working capital)

(Ni 4,000 tpd)

Ir

MINING COST DATA

MINERAL: Nickel

YEAR: 1968

State: N.A.

Mineral Availability Study

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite and peridotite (2

Mining Method: Open pit

Tonnage: 4,000 tpd

No. of Employees: 26

Tons per Man-shift: N.A.

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton	$0.364
Indirect Mining Costs per ton	$0.332
Fixed Costs per ton	$0.070
Capitalization Costs per ton	N.A.
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$0.766
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling . . .	$0.766

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

next ↓

① (2) oxide deposits of nickeliferous laterite occurring as weathering mantles atop serpentine or peridotite.

(Ni 4,000 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.090

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance – $0.057

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Assay - $0.003

General costs - $0.182

Direct Operating Costs

Production Labor
Maintenance Labor } $0.117

Operating Supplies, Powder, Steel - $0.242

Utilities – $0.005

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.016 (Taxes and insurance)

Depreciation – $0.054

Interest N.A.

General Management N.A

Selling, Marketing N.A

(Ni 4,000 lpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

total capital costs - $667,500
(including $129,500 working capital)

(Ni 8,000 tpd)

MINING COST DATA

MINERAL: Nickel

YEAR: 1968

State: N.A.

Mineral Availability Study

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite &

Mining Method: Open pit

Tonnage: 8,000 tpd

No. of Employees: 38

Tons per Man-shift: N.A.

Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton $0.319

Indirect Mining Costs per ton $0.275

Fixed Costs per ton $0.061

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $0.655

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $0.655

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

) and peridotite (2) oxide deposits of nickeliferous laterite occurring as weathering mantles atop serpentine or peridotite

(Ni 8,000 t/d

Indirect Costs

Labor, Management, Supervision, Clerical – $0.073

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance – $0.042

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Assay - $0.003

General costs - $0.157

Direct Operating Costs

Production Labor
Maintenance Labor } $0.081

Operating Supplies, Powder, Steel – $0.235

Utilities – $0.003

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) – $0.014 (taxes and insurance)

Depreciation – $0.047

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(Ni [illegible] omitted

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - $1,149,500
(including $218,500 working capital)

(Ni 20,000 tpd.

MINING COST DATA

MINERAL: Nickel
YEAR: 1968

State: N.A

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits: (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite and chalcopyrite and closely associated with norite and peridotite (2)

Mining Method: Open pit

Tonnage: 20,000 Tpd
No. of Employees: 75

Tons per Man-shift: N.A.
Miners Wages per time period: $3.25/hr

Direct Mining Costs per ton $0.268

Indirect Mining Costs per ton $0.207

Fixed Costs per ton $0.036

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $0.511

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $0.511

Market: Mill
Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① (2) oxide deposits of nickeliferous laterite occurring as weathering mantles atop serpentine or peridotite.

(Ni 20,000 tpd

Indirect Costs

Labor, Management, Supervision, Clerical - $0.047

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $0.032

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties N.A

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A

Assay - $0.002

General costs - $0.126

Direct Operating Costs

Production Labor

Maintenance Labor } $0.070

Operating Supplies, Powder, Steel - $0.196

Utilities - $0.002

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) - $0.008 (Taxes and insurance)

Depreciation - $0.028

Interest N.A.

General Management N.A

Selling, Marketing N.A.

(Ni 20,000 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs - # 1,846,000
(including # 436,000 working costs)

(Ni 40 tpd)

MINING COST DATA

MINERAL: Nickel **YEAR:** 1968

State: N.A

District or County: N.A Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8469

Type of Deposit:
Two types of deposits. (1) Sulfide deposits consisting mainly of pyrrhotite, pentlandite, and chalcopyrite and closely associated with norite and peridotite ①

Mining Method: Random room and pillar

Tonnage: 40 tpd **No. of Employees:** 4

Tons per Man-shift: N.A. **Miners Wages per time period:** $3.25/hr

Direct Mining Costs per ton	$3.223
Indirect Mining Costs per ton	$4.220
Fixed Costs per ton	$1.880
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$9.323
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$9.323

Market: Mill **Distance to Market:** N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

D (2) oxide deposits of nickeliferous laterite, occurring as weathering mantles atop serpentine or peridotite.

(Ni 40 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical — $1.400

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $0.920

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Assay - $0.050

General costs - $1.850

Direct Operating Costs

Production Labor — $1.750

Maintenance Labor — $0.200

Operating Supplies, Powder, Steel - $0.973

Utilities — $0.300

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) — $0.436 (Taxes and insurance)

Depreciation — $1.444

Interest N.A

General Management N.A.

Selling, Marketing N.A.

(N1 40 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Total capital costs $158,400
(including $14,000 working costs)

QUARTZITE

MINING COST DATA

MINERAL: Quartzite YEAR: 1964

State: Pennsylvania

District or County: Lancaster County

Mine: The Honey Brook Plant

Owner or Operator: George F. Pettinos, Inc.

Source of Information: IC 8248

Type of Deposit:

Chickies quartzite (quartzite with interlayered sericitic quartz)
Hellam conglomerate (coarse grained quartzite with scattered, round quartz pebbles and conglomerate beds with interbedded black slate) ①

Mining Method: Open pit

Tonnage: N.A

No. of Employees: N.A

Tons per Man-shift: N.A

Miners Wages per time period: N.A

Direct Mining Costs per ton . . . . 52.52% of TC

Indirect Mining Costs per ton . . . . 11.10 % of TC

Fixed Costs per ton . . . . 30.38% of TC

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . 94.00 % of TC

Milling Costs per ton . . . . 6.00% of TC

Total Costs per ton including Mining & Milling . . . 100.00% of TC

Market: Process Plant

Distance to Market: N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

see attached sheets

over ↓

① There is an overburden of soil averaging 5 ft. in depth. The Chickies quartzite is 600-800 ft. thick. The Hellam conglomerate is 200-400 ft thick. The exposed strata dip is 30° to the northeast.

TABLE 6. - Direct, indirect, and overhead expenditures in terms of percent of total cost, per ton of sand produced[1]

Account:	Percent of total cost
Direct expenditures:	
Preparation for mining	3.00
Mining	8.00
Processing	6.00
Storage	.02
Loading	4.00
Bagging	1.40
Vacation and holiday pay	2.10
Heat, light, and power[2]	7.00
Supplies	2.02
Repairs	9.00
Expendable tools	.06
Plant maintenance	10.42
Royalties	2.30
Payroll expense	3.20
Subtotal	58.52
Indirect expenditures:	
Supervision	4.20
Plant office	6.00
Payroll expense	.50
Miscellaneous	.40
Subtotal	11.10
Overhead expenditures:	
Insurance	.30
Depreciation	30.00
Taxes	.08
Subtotal	30.38
Grand total	100.00

---

[1] Period covered was 6 months in which 7,500 tons of sand were loaded.

[2] Power consumption averages 5.03 kwhr per ton of sand produced.

39,420.7 Million Kwh
18,317,000 tons ($4.97/ton)

The "Preparation for mining" account includes all stripping, primary drilling and blasting, and engineering involved. Labor under this account averages $0.109 per ton of rock mined. Because of the time lapse between primary blasting and loading all of the rock blasted, the company amortizes the expenses under the "Preparation for mining" account to cover this period. Table 5 and 6 show the man-hours expended per ton of sand produced. Since there is no idle time account in the system, most of the time costs gravitate to the "maintenance" account.

Overhead costs on a percentage basis are shown in table 6.

TABLE 5. - Man-hours expended per ton of sand produced

Period covered....months..	6
Total material loaded....tons of sand..	7,500
Labor expended....man-hours..	4,900
Labor expended by operation, percent of total man-hours:	
Mining	22
Processing[1]	18
Storage	1
Loading[2]	12
Bagging[3]	4
Vacation and holiday pay	5
Repairs	7
Plant maintenance	31
Total	100

[1] Includes labor for crushing, screening, and conveying the product.

[2] Loading the sand product for shipment to the consumer and preparing and loading cars for shipment.

[3] Applies only to tonnage bagged.

SAND & GRAVEL

MINING COST DATA

MINERAL: Sand & Gravel **YEAR:** 1963

State: Iowa

District or County: West Des Moines

Mine: Martin Marietta Corp. sand & gravel plant

Owner or Operator: Concrete Materials & Construction Div of Martin Marietta Corp.

Source of Information: IC 8202

Type of Deposit:

Sand & gravel deposit on river bank.

Mining Method: Hydraulic - cutter dredge

Tonnage: N.A **No. of Employees:** 20-26

Tons per Man-shift: N.A. **Miners Wages per time period:** N.A

Direct Mining Costs per ton . . . . 14% of TC

Indirect Mining Costs per ton . . . . N.A.

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . 14% of TC

Milling Costs per ton . . . . 86% of TC

Total Costs per ton including Mining & Milling . . . 100% of TC

Market: Mill **Distance to Market:** on site

Haulage Costs: included in Milling cost

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

ndirect Costs N.A.

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor }
Maintenance Labor } 7% of TC

Operating Supplies, Powder, Steel 2% of TC

Utilities 3% of TC

Transportation Mine to Mill included in utilities

Freight, Supplies Delivered

Future Development Costs NA

Maintenance and Service of Equipment included in Labor costs

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Sand & Gravel

YEAR: 1958

State: Michigan

District or County: Ottawa County

Mine: Ferrysburg Plant

Owner or Operator: Construction Aggregates Corp

Source of Information: IC 8092

Type of Deposit:
Sand & Gravel. Strata of shale, sandstone, siltstone and dolomite.

Mining Method: Manitowoc Model 3500 crane dragline (gravel),
Manitowoc Model 3500 crane clamshell (gravel)

Tonnage: 1,247,045 (8 mo.)

No. of Employees: N.A

Tons per Man-shift:
2,362 tons ①

Miners Wages per time period:
N.A

Direct Mining Costs per ton . . . . 75.21% of TC

Indirect Mining Costs per ton . . . . 11.21% of TC

Fixed Costs per ton . . . . 13.58% of TC

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . 100.00% of TC

Milling Costs per ton . . . . included in Total mining costs

Total Costs per ton including Mining & Milling . . . 100.00% of TC

Market: Screening & Crushing plant

Distance to Market: 16 miles (gravel)
1,000 yards (sand)

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① 3, 8-hr shifts/day, 5 days/week

$\left(\frac{22 \text{ working days}}{\text{mo}}\right)(8 \text{ mo})\left(\frac{3 \text{ shifts}}{\text{day}}\right) = 528 \text{ shifts}$

$\frac{1{,}247{,}045 \text{ tons}}{528 \text{ shifts}} = 2{,}362 \text{ tons}$

Indirect Costs

Labor, Management, Supervision, Clerical included in labor of DC

Mine Office, Warehouse - 1.26 % of TC

Payroll Overhead - Social Security, Insurance - 3.16 % of TC

Union Welfare, etc. - 4.26 % of TC (vacation and bonus)

Medical and Life Insurance - 2.53 % of TC

Royalties N.A

Pension Funds included in Payroll Overhead

Severance Tax included in Taxes of FC

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor
Maintenance Labor } 44.24% of TC

Operating Supplies, Powder, Steel - 12.48 % of TC

Utilities - 4.27 % of TC

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment - 14.22 % of TC

Fixed Costs

Property Taxes
Other Fixed Taxes (Severance) } 2.05 % of TC

Depreciation - 11.53% (includes depletion)

Interest N.A.

General Management included in labor of D.C.

Selling, Marketing N.A.

Capital Costs

Working Capital N.A

Purchase Cost N.A

Capitalization of Exploration and Development N.A

Roads and other local construction N.A.

Capitalization of Equipment N.A.

Capitalization of Plant N.A.

MINING COST DATA

MINERAL: Sand and Gravel **YEAR:** 1960

State: Minnesota

District or County: Hennepin, Ramsey, and Dakota Counties

Mine: 9 operations in the Minneapolis and St. Paul Area

Owner or Operator: ①

Source of Information: IC 8157

Type of Deposit:

Various deposits. Mostly sand and gravel outwashes

Mining Method: Generally open pit

Tonnage: 2,564,000 tons (1960) **No. of Employees:** N.A.

Tons per Man-shift: N.A. **Miners Wages per time period:** N.A

Direct Mining Costs per ton . . . . 39% of TC

Indirect Mining Costs per ton . . . . N.A.

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . 39% of TC

Milling Costs per ton . . . . 61% of TC

Total Costs per ton including Mining & Milling . . . 100% of TC

Market: beneficiating plants **Distance to Market:** some on site

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

(1) Glacier Sand and Gravel Co., Oscar Roberts Co., Consolidated Materials Co., Hedberg and Sons Co., Edward Kraemer and Sons, Inc., Barton Contracting Co., Arsenal Sand and Gravel Co., Landers-Norblom-Christenson Co., and Charles M. Friedheim Co.

Indirect Costs N.A.

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor
Maintenance Labor } 17% of TC (includes labor in loading, haulage, conveying, maintenance, misc. c̄ supervision)

Operating Supplies, Powder, Steel – 15% of TC

Utilities – 4% of TC

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Burden Costs - 3% of TC

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

SILVER

MINING COST DATA

MINE :Gold, Silver, Copper, Lead, Zinc YEAR: 1965 ①

State: Colorado

District or County: Creede District, Mineral County

Mine: Emperius

Owner or Operator: Emperius Mining Co.

Source of Information: IC 8370

Type of Deposit:
Oxidized and sulfide ores. The principal ore bearing rocks are in rhyolite, and are silver-lead fissure veins occupying fractured zones in the shattered rhyolites

Mining Method: Underground shrinkage stoping

Tonnage: 43,267 tons (1965) No. of Employees: N.A.

Tons per Man-shift: N.A.

Miners Wages per time period: hourly rates a bit lower than other mine districts

Direct Mining Costs per ton $10.400

Indirect Mining Costs per ton $3.603

Fixed Costs per ton $0.448

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $14.451

Milling Costs per ton $6.108

Total Costs per ton including Mining & Milling . . . $20.559

Market: Mill Distance to Market:

Haulage Costs: $1.96/ton (included in DC and Milling (trucks))

Method of Waste Disposal: Settling Pond

Method of Mined Land Rehabilitation: N.A.

Remarks:

① Information also available for 1942, 1947, 1949-1963
over ↓

Mineral composition: Gold - 0.029 oz/ton
Silver - 6.75 oz./ton
Copper - 0.52 %
Lead - 5.4 %
Zinc - 5.8 %

} average mill feed assay

Indirect Costs

Labor, Management, Supervision, Clerical included in salaries & wages

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $0.074

Union Welfare, etc. N.A.

Medical and Life Insurance - $0.168 (insurance & taxes not including state & Federal)

Royalties - $2.649

Pension Funds - $0.712 (SCIF & FICA)

Severance Tax N.A

Rehabilitation Costs N A

Direct Operating Costs

Production Labor
Maintenance Labor } $7.337 (salaries and wages)

Operating Supplies, Powder, Steel - $2.460

Utilities - $0.420

Transportation Mine to Mill - $0.145

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Assays - $0.038

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) N.A

Depreciation - $0.448

Interest N.A

General Management N.A.

Selling, Marketing N.A.

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1951

State: Idaho

Mining Dist. or County: Coeur d'Alene

Mine: Morning

Owner: American Smelting & Refining Co.

Type of Deposits: Sphalerite and galena in near vertical veins, Ore width 3-40'
5.7% Pb, 8.1% Zn, 2.0 oz. Ag

Mining Method: Stull set and fill

Type of Milling: Flotation

Tonnage: 320 T/day

No. of Employees:

Tons per man-shift:

Miners Wage: $12.45/day

Exploration Costs per ton:	$ Not included in totals
Development Costs per ton:	Included in Direct Mining
Direct Mining Costs per ton:	13.72
Indirect Costs per ton:	General 3.32
Depreciation of Plant & Equipment per ton:	
Total Costs excluding milling costs (per ton)	$ 22.04*
Milling Costs per ton:	2.03
Total Costs including costs (per ton):	$ 24.07*

Source: USBM IC 7743

Remarks: Heavy ground, ceased operation in 1953

* Excluding exploration costs

TALC

MINING COST DATA

MINERAL: Talc **YEAR:** 1958

State: Vermont

District or County: Johnson Township

Mine: Johnson Mine

Owner or Operator: Eastern Magnesia Talc Co.

Source of Information: IC 8142

Type of Deposit:
Mixed talc and magnesite (grit). Normal sequence from the center outward is: serpentine core, grit, talc, altered chlorite schist, and unaltered quartz-mica schist country rock

Mining Method: Two compartment, 45° incline shaft

Tonnage: 54,000 tons/yr **No. of Employees:** 15 (mine only)

Tons per Man-shift: N.A. **Miners Wages per time period:** $1.685/hr (mine)

Direct Mining Costs per ton . . . .
Indirect Mining Costs per ton . . . . } 22.34% of OC (mining)
Fixed Costs per ton . . . .

Capitalization Costs per ton . . . . } 20.00% of OC (other)
Cost of Rehabilitation per ton . . . .

Total Mining costs per ton (excluding Milling) . . . 42.34% of OC

Milling Costs per ton . . . . 54.77% of OC

Total Costs per ton including Mining & Milling . . . 97.11% of OC

Market: Mill **Distance to Market:** 2.8 miles

Haulage Costs: 2.89% of OC

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:
See attached sheets

COST AND PERFORMANCE DATA

TABLE 6. - Available cost and performance data January to July 1959[1]

	Dollars	Units
Power, with power factor 94-97, avg rate/kwhr/	0.0158	-
MINING		
Mine power, kwhr/ton hoisted	-	9.56
Mine wage scale man-hr/ft advance:		
Core drilling underground, AX size (avg, all rock)	-	0.16
Shaft raise in schist, 9 x 12 ft (drilling and blasting)[2]	-	3.00
Crosscut in serpentinite, 7 x 8 ft (drilling and blasting)	-	0.75
Drift in ore 8 x 8 ft (drilling and blasting)	-	0.23
Crosscut in schist, 7 x 8 ft (drilling and blasting)	-	1.33
Mucking and tramming in drifts and crosscuts	-	0.67
Explosives/ft advance:[3]		
Crosscut in schist, 7 x 8 ft	4.03	
Crosscut in serpentinite, 7 x 8 ft	2.12	
Drift in ore, 8 x 8 ft	1.49	
Raising incline shaft in schist (9 x 12 ft)	5.62	
Mine wage scale man-hrs/ton ore stoped and/ton ore hoisted, 1958:[4]		
Broken in shrinkage stoping (drilling and blasting)		0.073
Broken in sublevel ring drill stoping (drilling)		0.01
Ore hoisted, 1958 (all operations)		0.51
TRUCKING, MINE TO MILL		
Ore trucked (including depreciation and insurance), overall/ton	0.3216	
Ore trucked (including depreciation and insurance), overall/ton mile	0.059	
Ore trucked, truck operator, man-hrs/ton		0.052
Truck maintenance, repairs, supplies/ton trucked	0.062	
Truck maintenance, repairs, supplies/ton mile	0.011	
Gasoline and oil/ton trucked	0.045	
Gasoline and oil/ton mile	0.008	
MILLING		
Power, kwhrs/ton ore milled		95.00
Grinding, pebble replacement/ton ore ground	0.0024	
Drying, minus 5/8-in. ore, fuel oil/ton dried	0.2404	
Drying flotation product/ton product	1.05	
Pebble mill lining/ton ground	0.02	

e footnotes at end of table.

COST AND PERFORMANCE DATA

TABLE 6. - Available cost and performance data January to July 1959[1] (Con)

	Dollars	Units
Filter cloths/ton filtered	0.035	
Wage scale man-hrs/ton crushed		0.556
Wage scale man-hrs/ton finished product		1.28

[1] Unless otherwise noted.
[2] During last shaft raising (1954-55).
[3] Based on present cost of explosives.
[4] Last full year available.

Operating cost breakdown on a percentage basis for the year 1958 is given in table 7.

TABLE 7. - Costs for year of 1958

Costs	Percent
Mining	22.34.
Milling	54.77
Ore haulage	2.89
All other	20.00
Total	100.00

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TUNGSTEN

MINING COST DATA

MINERAL: Tungsten **YEAR:** 1957

State: California

District or County: Mono County

Mine: Black Rock Tungsten Mine

Owner or Operator: Wah Chang Mining Corp.

Source of Information: IC 7945

Type of Deposit:
Scheelite bearing tactite. The chief minerals in the ore, in order of abundance are: garnet, amphibole, diopside, calcite, epidote, quartz, and scheelite. Shcheelite, the only ore mineral forms crystals disseminated through the tactite.

Mining Method: Open pit, no rigid system of underground mining used

Tonnage: 12,500 tons / month **No. of Employees:** 66

Tons per Man-shift: 7.62 tons/man shift **Miners Wages per time period:** $2.11 / hr. ①

Direct Mining Costs per ton . . . .

Indirect Mining Costs per ton . . . .

Fixed Costs per ton . . . . $7.98 (see attached sheet)

Capitalization Costs per ton . . . .

Cost of Rehabilitation per ton . . . .

Total Mining costs per ton (excluding Milling) . . . $7.98

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $7.98

Market: N.A **Distance to Market:** N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

(1) Total average cost per man-shift of all wage earners at the mine, including incentive bonuses was #26.75.

Indirect Costs N/A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs N/A

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

Fixed Costs N/A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N/A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Mining & development costs per ton

Drilling and blasting	#1.79
Mucking	#0.65
Slushing	#0.62
Tramming	#0.51
Timbering	#0.19
Pipe and track	#0.23
Compressors	#0.16
Lubrication	#0.02
General Shop	#0.22
Vipping	#0.1[illegible]
Lighting	#0.0[illegible]
Sampling Ore	#0.1[illegible]
Diamond Drilling	#0.35
Equipment Rental (trucking ore)	#0.5[illegible]
General Mine Expense	#0.03
Allocated expense (depreciation, supervision etc)	#2.[illegible]
Total	#7.98

Labor	#3.33
Materials	#2.29
Other (depreciation [illegible] etc)	#[illegible]
	#7.98

RECENT MINING COST DATA

Mineral: Tungsten **Year:** 1957

State: California **Mining Dist. or County:** Indian

Mine: Black Rock

Owner: Wah Chang Mining Co.

Type of Deposit: Scheelite veins in tactite, Ore bodies 6-40 ft. thick dip 10° to 70°, 0.50% WO_3

Mining Method: None - Ore Mined as developed

Type of Milling:

Tonnage: 12 500 T/mo. **No. of Employees:** 35

Tons per man-shift: 17 **Miners Wage:** $2.11/hr.

Exploration Costs per ton:	$ Not included in Direct Mining
Development Costs per ton:	Included in Direct Mining
Direct Mining Costs per ton:	5.62
Indirect Costs per ton:	2.36
Depreciation of Plant & Equipment per ton:	Included in indirect cost
Total Costs excluding milling costs (per ton)	$ 7.98
Milling Costs per ton:	
Total Costs including milling costs (per ton)	$

Source: USBM IC 7945

Remarks: Ore to waste ratio 4.5 to 1, 70-80% extraction labor 42%, materials 28%, other 30%.

RECENT MINING COST DATA

Mineral: Tingsten　　Year: 1957

State: Nevada　　Mining Dist. or County: Lincoln County

Mine: Lincoln

Owner: Wah Chang Mining Co.

Type of Deposit: Scheelite veins in tactite 0.4% WO_3, 1.2% Zn 3.5% CaF_2.

Mining Method: Shrinkage

Type of Milling:

Tonnage: 20,000 T/mo.　　No. of Employees:

Tons per man-shift: 6.98　　Miners Wage: $2.19/hr.

Exploration Costs per ton:	$	Not included in Direct Mining
Development Costs per ton		1.73
Direct Mining Costs per ton:		5.36
Indirect Costs per ton:		Included in Direct Mining
Depreciation of Plant & Equipment per ton:		Included in ?Direct Mining
Total Costs excluding milling costs (per ton):	$	7.09
Milling Costs per ton:		
Total Costs including milling costs (per ton):	$	

Source: USBM IC 7907

Remarks: 0.35% WO_3 cuttoff ore to waste ratio: 4 to 1

(W 360 tpd)

MINING COST DATA

MINERAL: Tungsten

AR: 1970

State: N.A.

District or County: N.A.

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: I C 8500

Type of Deposit:
Tactite deposit. Three steeply dipping ore shoots occur in tactite along the contact of granite and limestone. The ore mineral is scheelite, ①

Mining Method: shrinkage stoping over level pillars and stope chutes

Tonnage: 360 tpd

No. of Employees: 35

Tons per Man-shift: N.A.

Miners Wages per time period: $3.50/hr

Direct Mining Costs per ton	$4.73
Indirect Mining Costs per ton	$1.92
Fixed Costs per ton	$2.02
Capitalization Costs per ton	$1.04
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling) . . .	$9.71
Milling Costs per ton	$5.71
Total Costs per ton including Mining & Milling . . .	$15.42

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① a calcium tungstate. The ore averages 10 ft. in width and exetends to a depth of 1,200 ft. in the middle shoot. Average grade: 1.0% WO_3

(W 360 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.41

Mine Office, Warehouse – $0.77 (Administration and general overhead)

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. – $0.74 (Fringe benefits)

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor – $1.54

Maintenance Labor – $0.51

Operating Supplies, Powder, Steel – $2.22

Utilities – $0.19

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment – $0.27

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes (~~Severance~~) – $0.21 (Taxes and insurance)

Depreciation – $1.81 (Depreciation and deferred expenses)

Interest N.A.

General Management N.A

Selling, Marketing N.A.

(W 360 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Development costs - $1.04

(W̄ 280 tpd

NING COST DATA

MINERAL: Tungsten **YEAR:** 1970

State: N.A

District or County: N.A Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A

Source of Information: IC 8500

Type of Deposit:
Tactite deposit. A low dip (20°-30°) ore body occurs in tactite along the contact of quartz monzonite and carbonate rocks. The ore mineral ①

Mining Method: Open Pit

Tonnage: 280 tpd **No. of Employees:** 15

Tons per Man-shift: **Miners Wages per time period:** $3.25 - $4.00 / hr.

Direct Mining Costs per ton $2.66

Indirect Mining Costs per ton $1.40

Fixed Costs per ton $3.13

Capitalization Costs per ton $1.18

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $8.37

Milling Costs per ton $6.99

Total Costs per ton including Mining & Milling . . . $15.36

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① is scheelite, a calcium tungstate. Associated with it is powellite, a calcium molybdate. The ore body has a strike length of approximately 550 ft. Average grade: 0.39% WO_3

(W 280 p.1)

Indirect Costs

Labor, Management, Supervision, Clerical – $0.44

Mine Office, Warehouse – $0.47 (Administration and general overhead)

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. – $0.49 (Fringe benefits)

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor – $0.76

Maintenance Labor – $0.38

Operating Supplies, Powder, Steel – # 1,28

Utilities N.A.

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment – $0.24

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) – $0.27 (Taxes and insurance)

Depreciation – #2,86 (depreciation and deferred expenses)

Interest N.A

General Management N.A

Selling, Marketing N.A

(W 280 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Development costs - #1.18

(W 125 tpd)

MINING COST DATA

MINERAL: Tungsten **YEAR:** 1970

State: N.A.

District or County: N.A. Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8500

Type of Deposit:
Tactite deposit. Two ore bodies occur in Tactite along a contact of granite and limestone. Scheelite, a calcium tungstate, is the chief ore mineral. About

Mining Method: Square set stoping

Tonnage: 125 tpd **No. of Employees:** 57

Tons per Man-shift: N.A. **Miners Wages per time period:** $4.00/hr

Direct Mining Costs per ton $16.27

Indirect Mining Costs per ton $7.39

Fixed Costs per ton $3.86

Capitalization Costs per ton $1.72

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $29.24

Milling Costs per ton $12.67

Total Costs per ton including Mining & Milling . . . $41.91

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① 25% of the tonnage is mined from the south ore body which is relatively narrow (average width 5 ft.) and dips about 60° to the east. The balance of the ore is mined from the flat-dipping (average of 45°) north ore body where the average width is 12 ft. Average grade: 1.25% WO_3.

(W 125 tpd)

Indirect Costs

Labor, Management, Supervision, Clerical - $1.11

Mine Office, Warehouse — $2.61 (Administration and general overhead)

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. — $3.67 (Fringe benefits)

Medical and Life Insurance, N.A

Royalties N.A

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs, N.A

Direct Operating Costs

Production Labor $10.50

Maintenance Labor — $1.22

Operating Supplies, Powder, Steel — $3.48

Utilities — $0.29

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment — $0.78

Fixed Costs

Property Taxes N.A

Other Fixed Taxes ~~(Severance)~~ - $0.39 (taxes and insurance)

Depreciation — $3.47 (depreciation and deferred expenses)

Interest N.A

General Management, N.A

Selling, Marketing N.A

(W 125 tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Development cost - $1.72

(W 60 tpd)

MINING COST DATA

MINERAL: Tungsten

YEAR: 1970

State: N.A.

District or County: N.A

Mineral Availability Study

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8500

Type of Deposit:
A tungsten-bearing quartz vein in Precambrian granite and metamorphic rocks. The vein consists of quartz and ferberite, a tungstate of iron.

Mining Method: shrinkage stope

Tonnage: 60 tpd

No. of Employees: 18

Tons per Man-shift: N.A.

Miners Wages per time period: $4.00/hr

Direct Mining Costs per ton $9.13

Indirect Mining Costs per ton $4.40

Fixed Costs per ton $13.31

Capitalization Costs per ton $4.96

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $31.80

Milling Costs per ton $15.54

Total Costs per ton including Mining & Milling . . . $47.34

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over

I Indirect Costs

Labor, Management, Supervision, Clerical [illegible]

① The ore occurs in four nearly vertical shoots. The vein averages 3ft. in width. The ore averages 1.6% WO_3. Average grade 1.6% WO_3

[illegible]

Payroll Overhead - Social Security, Insurance [illegible]

[illegible]

Medical and Life Insurance [illegible]

Royalties [illegible]

Pension Funds [illegible]

Severance Tax [illegible]

Rehabilitation Costs [illegible]

Direct Operating Costs

Production Labor [illegible]

Maintenance Labor [illegible]

Operating Supplies, Powder, Steel [illegible]

Utilities [illegible]

Transportation Mine to Mill [illegible]

Freight, Supplies Delivered [illegible]

Future Development Costs [illegible]

Maintenance and Service of Equipment [illegible]

Fixed Costs

Property Taxes [illegible]

Other Fixed Taxes [illegible]

Depreciation [illegible]

Interest [illegible]

General Management [illegible]

Selling, Marketing [illegible]

CW 60 tpd

Indirect Costs

Labor, Management, Supervision, Clerical - $0.73

Mine Office, Warehouse $1.48 (Administration and general overhead)

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. - $2.19 ↑ [illegible] benefits)

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor - $5.00

Maintenance Labor - $2.13

Operating Supplies, Powder, Steel $1.54

Utilities - $0.19

Transportation Mine to Mill, N.A.

Freight, Supplies Delivered, N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment [illegible]

Fixed Costs

Property Taxes N.A.

Other Fixed Taxes ~~(Severance)~~ [illegible] and [illegible]

Depreciation - $12.59 (depreciation [illegible] and [illegible]

Interest N.A.

General Management N.A.

Selling, Marketing N.A.

(W 60tpd)

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

Development cost - $4.96

URANIUM

MINING COST DATA

MINERAL: Uranium YEAR: 1963

State: New Mexico

District or County: McKinley County

Mine: Section 23

Owner or Operator: Homestake - Sapin Partners

Source of Information: IC 8280

Type of Deposit:
Coffinite (associated with asphaltic material, a coating on the sand grains). It normally occurs in ore lenses on roughly horizontal bedding planes, but occasionally "stacks" up to 100 ft. thick occur.

Mining Method: retreat-room-and-pillar, sublevel-slicing, horizontal-cut-and-fill, ring-drill (modified)

Tonnage: 134,129 (6 mo.) No. of Employees: N.A.

Tons per Man-shift: 9.52 Miners Wages per time period: \$3.07 - \$2.19/hr

Direct Mining Costs per ton	80.15 % of TC
Indirect Mining Costs per ton	15.86 % of TC
Fixed Costs per ton	4.11 % of TC
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	100.00 % of TC
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	100.00 % of TC

Market: Mill Distance to Market: 9 miles (approx)

Haulage Costs: 14.53 % of TC

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

ndirect Costs

Labor, Management, Supervision, Clerical - 6.90 % of TC

Mine Office, Warehouse - 1.47% of TC

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. 5.58 % of TC (employees welfare)

Medical and Life Insurance included in employees welfare

Royalties N.A.

Pension Funds included in employees welfare

Severance Tax N.A.

Rehabilitation Costs N.A.

Surface general - 1.91% of TC

Direct Operating Costs

Production Labor - 56.69% of TC

Maintenance Labor - 1.76 % of TC

Operating Supplies, Powder, Steel - 21.70% of TC

Utilities - 0.88 % of TC

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

Fixed Costs

Property Taxes

Other Fixed Taxes (Severance) } 4.11 % of TC (taxes other than Federal)

Depreciation N.A

Interest N.A.

General Management N.A

Selling, Marketing N.A.

Capital Costs

Working Capital N.A.

Purchase Cost N.A

Capitalization of Exploration and Development N.A

Roads and other local construction N.A.

Capitalization of Equipment N.A

Capitalization of Plant N.A

RECENT MINING COST DATA

Mineral: Uranium

Year: 1958

State: Colorado

Mining Dist. or County: Front Range (Jefferson County)

Mine: Schwartzwalder

Owner: Denven-Golden Oil and Uranium Co.

Type of Deposit: Pitchblonde in veins along faults in pre-cambrian metamorphic rocks. Ore bodies max. 150' long, 28' wide, Dip 55°- 60°, Grade 0.39 - 1.32% $U_3 O_8$.

Mining Method: Shrinkage Stope

Type of Milling:

Tonnage: 69 T/day - Ore -- 94 T/day Ore & Waste

No. of Employees: 34

[illegible]ons per man-shift: 2.17 ore
2.95 ore and waste

Miners Wage: Contract

	1/	2/	3/	4/
Exploration Costs per ton:..................................	$0.50	0.41	0.50	0.36
Development Costs per ton:..................................	1.29	1.04	4.51	2.68
Direct Mining Costs per ton:...............................	6.31	5.09	6.31	5.13
Indirect Costs per ton:......................................				
Depreciation of Plant & Equipment per ton:...............				
Total Costs excluding milling costs (per ton)...........	$8.10	6.54	11.32	8.27
Milling Costs per ton:..				
Total Costs including milling costs (per ton):..........	$			

Source: USBM IC 7963

Remarks: Both foot and hanging walls are firm and stand well.

1/ Stoping - ore only
2/ Stoping - ore and waste
3/ Stoping & Major Development - ore only
4/ Stoping & Major Development - ore & waste

MINING COST DATA

MINERAL: Uranium **YEAR:** 1958

State: olorado

District or County: Jefferson County

Mine: Schwartzwalder Uranium Mine

Owner or Operator: Denver Golden Oil & Uranium Co.

Source of Information: I.C 7963

Type of Deposit:
Precambrian metamorphic gneisses and schists. The ore [illegible] are pyrite, tennantite, sphalerite, chalcopyrite, [illegible] oxidized minerals derived from the primary minerals. Only the pitchblende occurs in commercial

Mining Method: Adits driven to crosscut the veins, [illegible]

Tonnage: 69 tons/day **No. of Employees:** 34

Tons per Man-shift: 2.17 tons / man shift **Miners Wages per time period:** N.A

Direct Mining Costs per ton	$17.65
Indirect Mining Costs per ton	$1.94
Fixed Costs per ton	N.A
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$19.59
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$19.59

Market: N.A **Distance to Market:** N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

quantities. Gangue minerals are ankerite, calcite, potassium, feldspar, quartz and chlorite. Dips usually are steep - in excess of 55° - and may be northeast or southwest

[illegible] damage [illegible] southerly, [illegible]
[illegible] terrain [illegible] Dip
[illegible] steep - in excess of 30 - [illegible] be
[illegible] or reclaimed

Indirect Costs

Labor, Management, Supervision, Clerical – $1.94

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A

Pension Funds N.A.

Severance Tax N.A

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor }

Maintenance Labor } $11.20

Operating Supplies, Powder, Steel – $2.66

Utilities – $0.70

Transportation Mine to Mill – $0.36

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment – $0.20

Prospecting – $0.86

Miscellaneous – $1.67

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Uranium (U_3O_8) **YEAR:** 1955-56

State: Utah

District or County: Monticello Mining District, San Juan County

Mine: Frisco School Section

Owner or Operator: Fred Zanett

Source of Information: IC 8015

Type of Deposit:
The ore was estimated to contain 0.24% U_3O_8 and had an average thickness of 3.7 ft.

Mining Method: N.A.

Tonnage: N.A. **No. of Employees:** 3

Tons per Man-shift: N.A **Miners Wages per time period:** \$10.50/ft of incline advance

Direct Mining Costs per ton \$7.52

Indirect Mining Costs per ton . . . . N.A.

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . \$7.52

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . \$7.52

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor

Maintenance Labor } $4.55

Operating Supplies, Powder, Steel - $2.97

Utilities N.A.

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs

Working Capital N.A.

Purchase Cost N.A.

Capitalization of Exploration and Development N.A

Roads and other local construction N.A.

Capitalization of Equipment N.A.

Capitalization of Plant N. A.

Equipment cost - $16,989

MINING COST DATA

MINERAL: Uranium (U_3O_8), V_2O_5 YEAR: 1955-1956

State: Utah

District or County: Green River District, Emery County

Mine: Vanura Mine

Owner or Operator: Four Corners Uranium Corp

Source of Information: IC 8015

Type of Deposit:

The principal ore zone is conglomeratic sandstone. The minerals have been identified as coffinite, corvusite, montroseite and possibly carnotite ①

Mining Method: Open stoping

Tonnage: 2,000 tons (May 1955-Jun 1956) No. of Employees: N.A

Tons per Man-shift: 3.1

Miners Wages per time period: N.A

Direct Mining Costs per ton $8.18

Indirect Mining Costs per ton . . . . N.A

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $8.18

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $8.18

Market: Mill Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

Indirect Costs N.A

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor $5.60

Maintenance Labor N.A.

Operating Supplies, Powder, Steel - $1.49

Utilities N.A.

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A.

Equipment Rental - $1.09

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs

Working Capital N.A

Purchase Cost N.A

Capitalization of Exploration and Development $ 38.91/ft (shaft sinking)

Roads and other local construction N.A

Capitalization of Equipment N.A

Capitalization of Plant N.A

MINING COST DATA

MINERAL: Uranium (U_3O_8)

YEAR: 1955

State: New Mexico

District or County: McKinley County

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8015

Type of Deposit:

Uranium deposit in limestone. The ore occurred within the top 5 ft. of the limestone and ranged from 1 ft to 2 ft. in Thickness.

Mining Method:

Tonnage: 1100 tons (4 months, 1955)

No. of Employees: N.A

Tons per Man-shift: 2.3 tons

Miners Wages per time period: N.A.

Direct Mining Costs per ton $11.97

Indirect Mining Costs per ton . . . . N.A.

Fixed Costs per ton . . . . N.A

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $11.97

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $11.97

Market: Mill

Distance to Market: N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

Indirect Costs N.A.

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs

Production Labor }
Maintenance Labor } $8.18 (includes supervision)

Operating Supplies, Powder, Steel - $1.71

Utilities

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment - $0.88
equipment rental - $1.20

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Uranium (U_3O_8), V_2O_5 **YEAR:** 1955

State: Colorado

District or County: Mesa County

Mine: La Salle Mine, Beaver Mesa

Owner or Operator: Utarado Mining Co.

Source of Information: IC 8015

Type of Deposit:
The ore occurs on a series of bench-forming sandstone lenses near the top of the 280-325 ft. thick Salt Wash. The Uranium-Vanadium deposits①

Mining Method: Open stoping

Tonnage: 5,083.84 **No. of Employees:** N.A

Tons per Man-shift: 1.89 tons **Miners Wages per time period:** N.A

Direct Mining Costs per ton $11.59

Indirect Mining Costs per ton $3.46

Fixed Costs per ton $1.43

Capitalization Costs per ton $0.07

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $16.48

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $16.55

Market: Mill. **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① were confined to the uppermost Salt Wash sandstone which ranges from 10-40 ft in thickness. Ore averages about 3 ft. in thickness. The ore was classified as carnotite-type, but the ore minerals were usually gray to black with only small quantities of carnotite present. The ore usually averaged 0.54% U_3O_8 and 1.33% V_2O_5. The formation's strike is about N. 25°E and dip about 2°NE.

ndirect Costs

Labor, Management, Supervision, Clerical - $1.66

Mine Office, Warehouse -$0.12

Payroll Overhead - Social Security, Insurance -$0.89

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A.

Severance Tax N.A.

Rehabilitation Costs N.A.

Employees travel and living expense - $0.58 | other - $0.08

Contract engineering fees - $0.13

Direct Operating Costs

Production Labor
Maintenance Labor } $7.52

Operating Supplies, Powder, Steel - $3.63

Utilities N.A.

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment - $0.44

Fixed Costs

Property Taxes -$0.10

Other Fixed Taxes (Severance) N.A

Depreciation - $1.33

Interest N.A

General Management N.A

Selling, Marketing N.A

Capital Costs

Working Capital N.A.

Purchase Cost – $15,889 – Equipment purchase (includes construction labor)

Capitalization of Exploration and Development N.A

Roads and other local construction N.A.

Capitalization of Equipment N.A.

Capitalization of Plant N.A.

Sales tax on equipment purchases - $10.07/ton

MINING COST DATA

MINERAL: Uranium (U_3O_8)

YEAR: 1955

State: Colorado

District or County: San Miguel County

Mine: Unnamed

Owner or Operator: N.A.

Source of Information: IC 8015

Type of Deposit:
Ore deposit very thin and spotty and averaged about 1 ft. in thickness.

Mining Method: Open stoping

Tonnage: 384.1 tons (April-July 1955)

No. of Employees: N.A.

Tons per Man-shift: 1.0 ton (excludes operator)

Miners Wages per time period: N.A.

Direct Mining Costs per ton	$25.82
Indirect Mining Costs per ton	$19.22
Fixed Costs per ton	N.A.
Capitalization Costs per ton	N.A
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$45.04
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$45.04

Market: Mill

Distance to Market: ①

Haulage Costs: $4.25/ton ($1.30 over AEC allowance, included in IC)

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

Value of ore produced: $60.25/ton including a development allowance of $4.37/ton. over↓

① Ore was shipped to the Uravan mill, in Colorado (50 miles) or the Monticello mill in Utah (40 miles)

Indirect Costs

Labor, Management, Supervision, Clerical — $5.16

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance — $1.67

Union Welfare, etc. N.A

Medical and Life Insurance - $0.44

Royalties - $8.33

Pension Funds N.A.

Severance Tax - $3.32 (county production tax)

Rehabilitation Costs N.A

Transportation - $0.30 (men and supplies)

Direct Operating Costs

Production Labor }
Maintenance Labor } $19.72

Operating Supplies, Powder, Steel - $3.76

Utilities N.A

Transportation Mine to Mill - $1.30 (over AEC allowance)

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment — $1.04

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Uranium (U_3O_8), V_2O_5 YEAR: 1955

State: Utah

District or County: Green River District, Emery County

Mine: Smith-Lucas Mine

Owner or Operator: Four Corners Uranium Corp.

Source of Information: IC 8015

Type of Deposit:
The ore occurred in the 40 to 70 ft. thick upper sandstone lens in the Salt Wash. The thickness ranged from a knife edge to 6 ft, ①

Mining Method: Open stoping

Tonnage: 1,353 tons (1955) No. of Employees: N.A

Tons per Man-shift: 2.3 Miners Wages per time period: N.A

Direct Mining Costs per ton	$13.67
Indirect Mining Costs per ton	$1.27
Fixed Costs per ton	$2.07
Capitalization Costs per ton	$0.15
Cost of Rehabilitation per ton	N.A.
Total Mining costs per ton (excluding Milling)	$17.16
Milling Costs per ton	N.A.
Total Costs per ton including Mining & Milling	$17.16

Market: Mill Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① with an average thickness of about 2 ft. The ore body trended about N. 63°E. The ore minerals were; coffinite, corvusite, and montrosite

Indirect Costs

Labor, Management, Supervision, Clerical N.A.

Mine Office, Warehouse – $0.78

Payroll Overhead - Social Security, Insurance - $0.49

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties N.A.

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs N.A.

Direct Operating Costs

Production Labor }
Maintenance Labor } $9.98

Operating Supplies, Powder, Steel – $2.18

Utilities N.A.

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment - $0.42

Equipment Rental - $0.59

other - $0.50

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) N.A

Depreciation – $2.07

Interest N.A

General Management N.A

Selling, Marketing N.A

Capital Costs

Working Capital N.A.

Purchase Cost N.A

Capitalization of Exploration and Development N.A

Roads and other local construction - $0.15

Capitalization of Equipment N.A.

Capitalization of Plant N.A.

MINING COST DATA

MINERAL: Uranium (U_3O_8), V_2O_5 **YEAR:** 1954-1955

State: Utah

District or County: Grand County

Mine: Ringtail Mine

Owner or Operator: The Norbute Corp

Source of Information: IC 8015

Type of Deposit: The ore bodies are tabular or lens-shaped masses, lying parallel to the bedding and ranging in thickness from a knife edge to 6 ft. Their ①

Mining Method: Open stoping

Tonnage: 1,878.64 (Aug 1954-Feb 1955) **No. of Employees:** 7

Tons per Man-shift: 1.5 tons

Miners Wages per time period: \$14-\$16/shift ②

Direct Mining Costs per ton $15.47

Indirect Mining Costs per ton $3.74

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $19.21

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $19.21

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

over ↓

① average thickness was about 2½ ft., and they lay 170 to 275 ft below the surface. The ore minerals were dark and often associated with carbonaceous material. The ore contained 0.24% U_3O_8 and 1.08% V_2O_5.

② The bonus paid the mine crew in any month was the dollar equivalent of the product of the number of tons of ore produced during that month, the % U_3O_8 it contained and the number of tons produced per man shift. The miners were paid an additional $0.25/day if they commuted to and from Thompson.

ndirec osts

Labor Management, Supervision, Clerical -$1.97

Mine Office, Warehouse N.A

Payroll Overhead - Social Security, Insurance - $1.19

Union Welfare, etc. N.A

Medical and Life Insurance - $0.22

Royalties N.A

Pension Funds

Severance Tax

Rehabilitation Costs

travel - $0.15

auto and truck expense - $0.21

Direct Operating Costs

Production Labor - $10.83

Maintenance Labor - included in production labor

Operating Supplies, Powder, Steel - $4.64

Utilities N.A

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING C ATA

MINERAL: Uranium U_3O_8 **YEAR:** 1955

State: Colorado

District or County: San Miguel County

Mine: Veta Mad

Owner or Operator: Gayno Mining Co.

Source of Information: IC 8015

Type of Deposit:
Uranium (U_3O_8) occurred within one continuous sandstone layer ranging from 60 to 90 ft. in thickness in the upper part of a salt wash. The ①

Mining Method: Irregular stopes with random pillars
selective mining

Tonnage: 3,124.63 (Feb-Dec 1955) **No. of Employees:**

Tons per Man-shift: **Miners Wages per time period:**

Direct Mining Costs per ton $9.99

Indirect Mining Costs per ton $16.43

Fixed Costs per ton . . . . N.A.

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $26.42

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $26.42

Market: Mill **Distance to Market:** 60 miles

Haulage Costs: $4.50/ton ($3.60 government haulage allowance)

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

over ↓

① strike of the ore is approximately S. 50°E. The ore was irregular and discontinuous. The ore minerals were predominantly carnotite and a black mineral

Indirect Costs

Labor, Management, Supervision, Clerical – $2.94

Mine Office, Warehouse – $3.29

Payroll Overhead - Social Security, Insurance $0.78

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties – $8.56

Pension Funds N.A

Severance Tax – $0.59 (production taxes)

Rehabilitation Costs N.A.

auto and truck expense, and travel - $0.26

assay charges - $0.01

Direct Operating Costs

Production Labor – $7.46

Maintenance Labor - included in production labor

Operating Supplies, Powder, Steel – $2.33

Utilities N.A.

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A.

Future Development Costs N.A.

Maintenance and Service of Equipment – $0.20

Fixed Costs N.A.

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Uranium (U_3O_8), V_2O_5 **YEAR:** 1954

State: Colorado

District or County: Montrose County

Mine: La Salle Mine on Club Mesa

Owner or Operator: Carbide Nuclear Co.

Source of Information: IC 8015

Type of Deposit:
Uranium-vanadium ore bodies in the upper layer of sandstone lenses

Mining Method: Open stoping

Tonnage: 23,157.4 tons (1954) **No. of Employees:** 28

Tons per Man-shift: 2.9 tons **Miners Wages per time period:**

Direct Mining Costs per ton	$7.39
Indirect Mining Costs per ton	$7.01
Fixed Costs per ton	$0.57
Capitalization Costs per ton	$1.60
Cost of Rehabilitation per ton	N.A
Total Mining costs per ton (excluding Milling) . . .	$16.57
Milling Costs per ton	N.A
Total Costs per ton including Mining & Milling . . .	$16.57

Market: Mill **Distance to Market:** about 3 miles

Haulage Costs: $1.09/ton

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A

Remarks:

Indirect Costs

Labor, Management, Supervision, Clerical - $0.76/ton

Mine Office, Warehouse - $0.04/ton (includes mine safety)

Payroll Overhead - Social Security, Insurance - $0.79/ton

Union Welfare, etc. N.A.

Medical and Life Insurance N.A

Royalties - $ 5.34/ton

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A

auto and truck expense - $0.04/ton | other, at mine - $0.03/ton

Assaying - $0.01/ton

Direct Operating Costs

Production Labor -
Maintenance Labor } $4.58/ton

Operating Supplies, Powder, Steel - $1.50/ton

Utilities - $0.44/ton

Transportation Mine to Mill - $0.59/ton (ore haulage above AEC allowance)

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment - $0.28/ton

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) N.A

Depreciation - $0.57/ton

Interest N.A

General Management N.A.

Selling, Marketing N.A

Capital Costs

Working Capital N.A.

Purchase Cost N. A

Capitalization of Exploration and Development - $117.79 per foot ①

Roads and other local construction N. A.

Capitalization of Equipment N. A

Capitalization of Plant N.A

Amortization - $1.60/ton

① Sinking and cribbing a 270-ft deep 2 compartment vertical shaft with a rock size of 10½ by 5½ ft.

RECENT MINING COST DATA

Mineral: Uranium

Year: 1955

State: Utah

Mining Dist. or County: Big Indian

Mine: Big Buck

Owner: Standard Uranium Corp.

Type of Deposit: Uraninite in Chinle form., 10' aver. thickness.

Mining Method: Open Stope

Type of Milling:

Tonnage: 7,500 T/mo.

No. of Employees: 38

Tons per man-shift: 9.9

Miners Wage: $2.15/hr.

Exploration Costs per ton:.................................... $ Not included in total

Development Costs per ton:.................................... 0.28

Direct Mining Costs per ton:.................................. 4.95

Indirect Costs per ton:....................................... 2.09

Depreciation of Plant & Equipment per ton:................ Included in total

Total Costs excluding milling costs (per ton):........... $ 7.32 1/

Milling Costs per ton:......................................

Total Costs including milling costs (per ton):........... $

Source: USBM IC 7766

Remarks: Mechanized trackless mining.

1/ Excludes depletion allowance and amortization

RECENT MINING COST DATA

Mineral: Uranium

Year: 1955-1957

State: Utah

Mining Dist. or County: Temple Mtn.

Mine: Calyx NO. 3
Calyx NO. 8

Owner: Consolidated Uranium Mines, Inc.

Type of Deposit: Uraninite in asphaltic material in Chinle form., 0.25% $U_3 0_8$.

Mining Method: Open Stope

Type of Milling:

Tonnage: 1,500 T/mo. - Calyx No. 3
1,000 T/mo. - Calyx No. 8

No. of Employees: 7 (No. 3)
12 (No. 8)

Tons per man-shift: 4.1 aver. - both mines

Miners Wage: $2.10/hr.
$2.25/hr.

		Calyx No. 3	Calyx No. 8
Exploration Costs per ton:..........................	$		
Development Costs per ton:..........................		0.84	0.95
Direct Mining Costs per ton:........................		6.26	6.06
Indirect Costs per ton:.............................		1.38	1.18
Depreciation of Plant & Equipment per ton:..........			
Total Costs excluding milling costs (per ton).......	$	8.48 1/	8.19 1/
Milling Costs per ton:..............................			
Total Costs including milling costs (per ton):......	$		

Source: USBM IC 7811

Remarks:

[illegible]/ Excluding exploration, depreciation.

83492

RECENT MINING COST DATA

Mineral: Uranium

Year: 1956

State: Utah

Mining Dist. or County: Big Indian

Mine: Continental NO. 1

Owner: Continental Uranium, Inc.

Type of Deposit: Uraninite in Chinle form. 7' aver. thickness.

Mining Method: Open Stope

Type of Milling:

Tonnage: 1,500 T/mo.

No. of Employees: 12

Tons per man-shift: 5.6

Miners Wage: 2.05/hr. plus bonus

Exploration Costs per ton:	$
Development Costs per ton:	
Direct Mining Costs per ton:	8.26
Indirect Costs per ton:	0.78
Depreciation of Plant & Equipment per ton:	
Total Costs excluding milling costs (per ton)	9.04 1/
Milling Costs per ton:	
Total Costs including milling costs (per ton):	

Source: USBM IC 7801

Remarks:

1/ Excluding exploration and development costs or amortization, depreciation, taxes, royalty, insurance, etc.

RECENT MINING COST DATA

Mineral: Uranium

Year: 1957

State: Colorado

Mining Dist. or County: Uravan Mineral Belt

Mine: Weighted average for 10 mines

Owner: Union Carbide Corp.

Type of Deposit: Carnotite in Morrison S.S. form. 3' aver. thickness.

Mining Method: Open Stope

Type of Milling:

Tonnage: 70-1000 T/mo.

No. of Employees:

Tons per man-shift: 2.3

Miners Wage:

Exploration Costs per ton:.................................. $

Development Costs per ton:.................................. 2.11

Direct Mining Costs per ton:................................ 9.06

Indirect Costs per ton:..................................... 1.65

Depreciation of Plant & Equipment per ton:................ ____________

Total Costs excluding milling costs (per ton):............ $ 12.82 1/

Milling Costs per ton:...................................... ____________

Total Costs including milling costs (per ton):............ $

Source: USBM IC 7922

Remarks: Leased mines, see chart of thickness v. direct cost and costs at individual mines.

Excluding lessor costs for exploration, and engineering administration, taxes, etc.

MINING COST DATA

MINERAL: Uranium

YEAR: 1957-1958

State: Arizona

District or County: Apache County

Mine: Mesa No. 2

Owner or Operator: Kerr-McGee Oil Industries, Inc

Source of Information: IC 8011

Type of Deposit:
Lenticular beds of fine-grained sandstone interlensed with thin beds of mudstone. Ore minerals are carnotite, tuyamunite and some vanadium minerals

Mining Method: Room & Pillar

Tonnage: 40,600 tons (June 1957-June 1958)

No. of Employees: 42

Tons per Man-shift:
6.4 tons (ore & waste)

Miners Wages per time period:
$1.70/hr.

Direct Mining Costs per ton $7.62

Indirect Mining Costs per ton $2.95

Fixed Costs per ton $0.86

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $11.43

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . $11.43

Market: Mill

Distance to Market: 4½ miles

Haulage Costs: $0.075/ton-mile

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

Indirect Costs

Labor, Management, Supervision, Clerical —$ 1.18

Mine Office, Warehouse - $0.67

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A.

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A.
Exploration drilling - $1.10

Direct Operating Costs

Production Labor — $3.46

Maintenance Labor - $0.47

Operating Supplies, Powder, Steel - $2.31

Utilities - $0.60

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A.

Future Development Costs N.A

Maintenance and Service of Equipment N.A
Equipment Rentals - $0.14
Ore haulage - $0.64

Fixed Costs

Property Taxes

Other Fixed Taxes (~~Severance~~) } $0.27 (Taxes & insurance)

Depreciation — $0.59

Interest N.A.

General Management N.A.

Selling, Marketing N.A

Capital Costs N/A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING COST DATA

MINERAL: Uranium **YEAR:** 1959

State: Wyoming

District or County: Fremont and Natrona Counties (Gas Hills)

Mine: Sateco Mine

Owner or Operator: Vitro Minerals Corp.

Source of Information: IC 8151

Type of Deposit:
Lenticular, course-grained, poorly sorted arkosic sandstone interbedded with mudstone, carbonaceous shale, and conglomerate beds.

Mining Method: Open Pit

Tonnage: 45,000 tons per month **No. of Employees:** 51

Tons per Man-shift: N.A **Miners Wages per time period:** N.A

Direct Mining Costs per ton . . . . } see attached sheets

Indirect Mining Costs per ton . . . . }

Fixed Costs per ton . . . . }

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . see attached sheets

Milling Costs per ton . . . . N.A

Total Costs per ton including Mining & Milling . . . see attached sheets

Market: Mill **Distance to Market:** N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

TABLE 5. - Dragline stripping cost data, Vitro Minerals Corp., 1958[1]

Walking dragline, 6-cubic-yard bucket (used)	cost	$150,000
Bulldozer	do.	32,000
Average stripping rate	cubic yards per hour	217

Operation	Cost per cubic yard
Drilling cost	$0.0034
Blasting cost, labor and explosives	.042
Dragline:	
Labor	.0239
Fuel	.0203
Maintenance	.0032
Tractor-dozer:	
Labor	.0115
Fuel	.0041
Maintenance	.0002
Equipment depreciation	.075
Total	$0.2142

[1] Most of these data were taken from a paper presented by Roy Coulson, superintendent, at the 1958 convention of Wyoming Mining Association.

TABLE 6. - Direct mining costs by percentages of operation, Vitro Minerals Corp., 1959, using motor-scraper stripping equipment

Total cubic yards stripped	1,037,063
Total tons waste mined	240,845
Total tons ore mined	141,014
Waste mined, percent	63.1
Ore mined, percent	36.9

Operation	Costs, percent	Hours of operation	Cost per hour	Cost, percent of operation	Cost, percent of all operations
Stripping (48 percent of total cost)					
Motor-scrapers, 3:					
Operation	$23.36	8,607	$11.14	58.39	28.05
Operator	27.90				
Oiler	5.37				
Maintenance labor	2.24				
Depreciation	37.59				
Payroll overhead	3.54				
Total	100.00				
Tractor-ripper:					
Operation	26.98	2,913	12.51	22.19	10.65
Operator	28.09				
Oiler	4.80				
Maintenance labor	2.58				
Depreciation	34.00				
Payroll overhead	3.55				
Total	100.00				

TABLE 6. - Direct mining costs by percentages of operation, Vitro Minerals Corp., 1959, using motor-scraper stripping equipment (Con.)

Operation	Costs, percent	Hours of operation	Cost per hour	Cost, percent of operation	Cost, percent of all operations
Stripping (48 percent of total cost) (Con.)					
Push tractor:					
Operation	$15.16	323	$6.35	1.25	0.60
Operator	46.70				
Oiler	15.65				
Maintenance labor	1.75				
Depreciation	14.29				
Payroll overhead	6.45				
Total	100.00				
Motor-grader:					
Operation	15.26	2,584	6.87	10.80	5.19
Operator	44.33				
Oiler	3.52				
Maintenance labor	2.41				
Depreciation	29.45				
Payroll overhead	5.03				
Total	100.00				
[illegible]inkling truck:					
Operation	18.66	486	3.39	1.00	.48
Operator	70.90				
Maintenance labor	2.53				
Payroll overhead	7.91				
Total	100.00				
Supervision, shifters	-	2,913	3.59	6.37	3.06
Ore and waste mining (33.33 percent of total cost)					
Shovel, 5/8-cubic-yard:					
Operation	26.84	2,077	14.79	24.74	8.99
Operator	22.89				
Oiler	5.62				
Maintenance labor	1.19				
Depreciation	40.52				
Payroll overhead	2.94				
Total	100.00				
Front-end loader, 1-cubic-yard:					
Operation	15.68	1,303	10.33	10.83	3.94
Operator	31.19				
Oiler	11.02				
Maintenance labor	.56				
Depreciation	32.11				
Payroll overhead	9.44				
Total	100.00				

TABLE 6. - Direct mining costs by percentages of operation, Vitro Minerals Corp., 1959, using motor-scraper stripping equipment (Con.)

Operation	Costs, percent	Hours of operation	Cost per hour	Cost, percent of operation	Cost, percent of all operations
Ore and waste mining (33.33 percent of total cost) (Con.)					
Tractor-dozer:					
Operation...........	$40.24	2,089	$9.98	16.78	6.10
Operator............	29.78				
Oiler...............	8.94				
Maintenance labor...	2.27				
Depreciation........	14.67				
Payroll overhead....	4.10				
Total..........	100.00				
Pit trucks:					
Operation...........	15.37	1,252	5.39	35.35	12.84
Drivers.............	51.19				
Maintenance labor...	1.80				
Depreciation........	26.12				
Payroll overhead....	5.22				
Total..........	100.00				
Rental equipment:					
Trucks..............	84.80	-	-	2.65	.96
Shovel, 1/2-cubic-yard...............	12.60				
Shovel, 2-1/2-cubic-yard...............	2.60				
Total..........	100.00				
Drilling and blasting:					
Air compressor......	3.29	-	-	9.65	3.51
Labor...............	61.58				
Explosives..........	29.11				
Payroll overhead....	6.02				
Total.........	100.00				
Stockpile front-end loader (4.19 percent of total cost)					
Operation................	30.24	2,358	6.08	-	4.19
Operator.................	43.76				
Maintenance labor........	3.53				
Depreciation.............	17.88				
Payroll overhead.........	4.59				
Total................	100.00				
Miscellaneous (11.44 percent of total costs)					
Assay costs..............	19.13	-	-	-	11.44
Probing-tower checker....	11.42				
Pitman...................	14.68				
Bucking-room labor.......	33.10				
Stockpile labor..........	12.95				
Other....................	1.43				
Total...............	100.00				

MINING COST DATA

MINERAL: Uranium

YEAR: 1959

State: Wyoming

District or County: Freemont and Natrona Counties (Gas Hills Area)

Mine: Day - Loma

Owner or Operator: Western Nuclear Inc

Source of Information: IC 8151

Type of Deposit:
Lenticular, coarse grained, poorly sorted arkosic sandstone interbedded with mudstone, carbonaceous shale, and conglomerate beds.

Mining Method: Open Pit

Tonnage:
75,416 tons (11 June 1958 - 31 July 1959)

No. of Employees: N.A

Tons per Man-shift: N.A.

Miners Wages per time period:
$2.72 - $2.80/hr (shovel operator)

Direct Mining Costs per ton $1.065

Indirect Mining Costs per ton $0.111

Fixed Costs per ton $0.152

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $1.328

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $1.328

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:
Only direct mining and stripping costs provided

Indirect Costs

Labor, Management, Supervision, Clerical – $0.111

Mine Office, Warehouse N.A.

Payroll Overhead - Social Security, Insurance N.A.

Union Welfare, etc. N.A.

Medical and Life Insurance N.A.

Royalties N.A

Pension Funds N.A

Severance Tax N.A.

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor } $0.531

Maintenance Labor }

Operating Supplies, Powder, Steel – $0.148

Utilities – $0.102 (power or fuel costs)

Transportation Mine to Mill N.A.

Freight, Supplies Delivered N.A

Future Development Costs N.A.

Maintenance and Service of Equipment N.A.

other direct operating costs - $0.284

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance) N.A

Depreciation – $0.152

Interest N.A.

General Management N.A

Selling, Marketing N.A

Capital Costs N.A.

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

MINING C ATA

MINERAL: Uranium **YEAR:** 1959

State: Wyoming

District or County: Freemont and Natrona Counties (Gas Hills Area)

Mine: Bullrush Mine

Owner or Operator: Western Nuclear, Inc.

Source of Information: IC 8151

Type of Deposit:
Lenticular, coarse-grained, poorly sorted arkosic sandstone interbedded with mudstone, carbonaceous shale, and conglomerate beds.

Mining Method: Open Pit

Tonnage: ① **No. of Employees:** N.A.

Tons per Man-shift: N.A. **Miners Wages per time period:** N.A.

Direct Mining Costs per ton $0.619

Indirect Mining Costs per ton $0.272

Fixed Costs per ton $0.180

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $1.07

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $1.07

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A.

Method of Waste Disposal: N.A.

Method of Mined Land Rehabilitation: N.A.

Remarks:

see attached sheet, Table 9

Indirect Costs [illegible]

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

① July 1960 - May 1961
Bullrush mine - 7,700,000 yd^3

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs – [illegible]

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

Transportation Pits to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

Fixed Costs

Property Taxes N/A

Other Fixed Taxes (Severance) N/A

Depreciation – [illegible]

Interest N/A

General Management N/A

Selling, Marketing N/A

Indirect Costs - $0.272

- Labor, Management, Supervision, Clerical
- Mine Office, Warehouse
- Payroll Overhead - Social Security, Insurance
- Union Welfare, etc.
- Medical and Life Insurance
- Royalties
- Pension Funds
- Severance Tax
- Rehabilitation Costs

Direct Operating Costs - $0.619

- Production Labor
- Maintenance Labor
- Operating Supplies, Powder, Steel
- Utilities
- Transportation Mine to Mill
- Freight, Supplies Delivered
- Future Development Costs
- Maintenance and Service of Equipment

Fixed Costs

- Property Taxes N.A
- Other Fixed Taxes (Severance) N.A
- Depreciation - $0.180
- Interest N.A
- General Management N.A
- Selling, Marketing N.A

Capital Costs N.A

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

TABLE 8. - Direct mining and stripping costs at Day-Loma mine[1]

Period covered..............June 11, 1958 to July 31, 1959
Total material stripped, yards..................1,390,000
Total ore mined during period, tons................75,416
Contract stripping average cost, per cubic yard.....$0.266

	Labor	Supplies	Supervision	Power or fuel costs	Depreciation	Other	Total per ton of ore
Loading................	$0.044	$0.044	-	$0.011	$0.032	$0.030	$0.161
Hauling and shipping....	.108	.015	-	.022	.066	.072	.283
Pit ripping and grading.	.018	.023	-	.007	-	.004	.052
Drilling and blasting...	.008	.017	-	.001	.015	.004	.045
Pumping.................	.072	.018	-	.025	.004	.004	.123
Stockpiling.............	.004	-	-	.003	.004	.002	.013
Mine roads, etc.........	-	.010	-	.001	.003	.010	.024
Ore control and sampling	.091	.001	$0.013	-	.004	.014	.123
Equipment maintenance and mine office.......	.173	.017	.006	.029	.021	.033	.279
Supervision.............	-	-	.092	-	-	.012	.104
Engineering.............	.008	.003	-	-	-	.015	.026
Miscellaneous...........	.005	-	-	.003	.003	.084	.095
Total mining.......	.531	.148	.111	.102	.152	.284	1.328
Grand total........	-	-	-	-	-	-	1.328

[1]Does not include overhead, geological, exploration, or engineering expenses prior to actual operations.

TABLE 9. - Direct mining costs for ore and waste by Western Nuclear, Inc., at the Frazier-Lamac and Bullrush operations, July 1960 through May 1961

Total material stripped, cubic yards:
Frazier-Lamac mine.......................[1]21,200,000
Bullrush mine............................[2]7,700,000

	Frazier-Lamac mine (plus 300 feet deep), cost per ton	Bullrush mine (200 feet deep), cost per ton	
Loading..............................	$0.096	$0.096	
Hauling..............................	.154	.266	Direct Operating Costs
Drilling and blasting................	.046	.102	
Pumping (1,000 gpm av)...............	.043	.096	
Stockpiling..........................	.061	.059	
Mine roads and grounds...............	.017	.014	Indirect Costs
Pit ripping and grading..............	.050	.034	
Ore control and sampling.............	.080	.084	
Mine engineering and safety..........	.020	.025	
General administration and supervision.	.110	.115	
Total............................	.677	.890	
Depreciation.........................	.156	[3].180	- Fixed Costs
Total cost per ton with depreciation...........	.833	1.07	

[1] Contract stripping in four phases.
[2] Contract and company stripping in six phases.
[3]Mining equipment depreciation only.

MINING COST DATA

MINERAL: Uranium **YEAR:** 1959

State: Wyoming

District or County: Freemont and Natrona Counties (Gas Hills Area)

Mine: Frazier-Lamac

Owner or Operator: Western Nuclear, Inc.

Source of Information: IC 8151

Type of Deposit:
Lenticular, coarse-grained, poorly sorted arkosic sandstone interbedded with mudstone, carbonaceous shale, and conglomerate beds.

Mining Method: Open Pit

Tonnage: ① **No. of Employees:** N.A

Tons per Man-shift: N.A **Miners Wages per time period:** N.A

Direct Mining Costs per ton $0.400

Indirect Mining Costs per ton $0.277

Fixed Costs per ton $0.156

Capitalization Costs per ton . . . . N.A

Cost of Rehabilitation per ton . . . . N.A

Total Mining costs per ton (excluding Milling) . . . $0.833

Milling Costs per ton . . . . N.A.

Total Costs per ton including Mining & Milling . . . $0.833

Market: Mill **Distance to Market:** N.A.

Haulage Costs: N.A

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A

Remarks:

see attached sheet, table 9

① July 1960 – May 1961

Frazier-Lamac mine – 21,200,000 yds^3

Indirect Costs – $0.277

Labor, Management, Supervision, Clerical

Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance

Union Welfare, etc.

Medical and Life Insurance

Royalties

Pension Funds

Severance Tax

Rehabilitation Costs

Direct Operating Costs – $0.400

Production Labor

Maintenance Labor

Operating Supplies, Powder, Steel

Utilities

Transportation Mine to Mill

Freight, Supplies Delivered

Future Development Costs

Maintenance and Service of Equipment

Fixed Costs

Property Taxes

Other Fixed Taxes (Severance)

Depreciation – $0.156

Interest

General Management

Selling, Marketing

Capital Costs

Working Capital

Purchase Cost

Capitalization of Exploration and Development

Roads and other local construction

Capitalization of Equipment

Capitalization of Plant

TABLE 8. - Direct mining and stripping costs at Day-Loma mine[1]

Period covered..............June 11, 1958 to July 31, 1959
Total material stripped, yards..................1,390,000
Total ore mined during period, tons.................75,416
Contract stripping average cost, per cubic yard.....$0.266

	Labor	Supplies	Supervision	Power or fuel costs	Depreciation	Other	Total per ton of ore
Loading................	$0.044	$0.044	-	$0.011	$0.032	$0.030	$0.161
Hauling and shipping....	.108	.015	-	.022	.066	.072	.283
Pit ripping and grading.	.018	.023	-	.007	-	.004	.052
Drilling and blasting...	.008	.017	-	.001	.015	.004	.045
Pumping................	.072	.018	-	.025	.004	.004	.123
Stockpiling............	.004	-	-	.003	.004	.002	.013
Mine roads, etc.........	-	.010	-	.001	.003	.010	.024
Ore control and sampling	.091	.001	$0.013	-	.004	.014	.123
Equipment maintenance and mine office.......	.173	.017	.006	.029	.021	.033	.279
Supervision............	-	-	.092	-	-	.012	.104
Engineering............	.008	.003	-	-	-	.015	.026
Miscellaneous...........	.005	-	-	.003	.003	.084	.095
Total mining.......	.531	.148	.111	.102	.152	.284	1.328
Grand total........	-	-	-	-	-	-	1.328

s not include overhead, geological, exploration, or engineering expenses prior to actual operations.

TABLE 9. - Direct mining costs for ore and waste by Western Nuclear, Inc., at the Frazier-Lamac and Bullrush operations, July 1960 through May 1961

Total material stripped, cubic yards:
Frazier-Lamac mine...................... [1]21,200,000
Bullrush mine........................... [2]7,700,000

	Frazier-Lamac mine (plus 300 feet deep), cost per ton	Bullrush mine (200 feet deep), cost per ton
Loading.............................	$0.096	$0.096
Hauling.............................	.154 Direct	.266
Drilling and blasting...............	.046 Operating	.102
Pumping (1,000 gpm av)..............	.043 Costs	.096
Stockpiling.........................	.061	.059
Mine roads and grounds..............	.017 Indirect	.014
Pit ripping and grading.............	.050	.034
Ore control and sampling............	.080 Costs	.084
Mine engineering and safety.........	.020	.025
General administration and supervision.	.110	.115
Total............................	.677	.890
Depreciation........................	.156 - Fixed cost	[3].180
Total cost per ton with depreciation................	.833	1.07

tract stripping in four phases.

[2] Contract and company stripping in six phases.

[3] Mining equipment depreciation only.

VANADIUM

RECENT MINING COST DATA

Mineral: Uranium

Year: 1955

State: Utah

Mining Dist. or County: Big Indian

Mine: Big Buck

Owner: Standard Uranium Corp

Type of Deposit: Uraninite in Chinle form., 10' aver. thickness.

Mining Method: Open Stope

Type of Milling:

Tonnage: 7,500 T/mo.

No. of Employees: 38

Tons per man-shift: 9.9

Miners Wage: $2.15/hr.

Exploration Costs per ton:.................................. $ Not included in total

Development Costs per ton:.................................. 0.28

Direct Mining Costs per ton:................................ 4.95

Indirect Costs per ton:..................................... 2.09

Depreciation of Plant & Equipment per ton:................ Included in total

Total Costs excluding milling costs (per ton):............ $ 7.32 1/

Milling Costs per ton:.......................................

Total Costs including milling costs (per ton):............ $

Source: USBM IC 7766

Remarks: Mechanized trackless mining.

1/ Excludes depletion allowance and amortization

ZINC

MINING COST DATA

MINERAL: Zinc-Lead YEAR: 1956

State: Washington

District or County: Stevens County

Mine: Deep Creek Zinc-Lead Mine

Owner or Operator: Goldfield Consolidated Mines Co.

Source of Information: IC 8174

Type of Deposit:
pale-yellow to dark-brown sphalerite found in small veinlets sparsely disseminated through the dolomite as a replacement deposit

Mining Method: Open stope long-hole inverted rill bench stoping

Tonnage: 79,580 (1956) No. of Employees: N A

Tons per Man-shift: 9.8 tons

Miners Wages per time period: comparable to other NW mining districts (non union)

Direct Mining Costs per ton $3.825

Indirect Mining Costs per ton $0.610

Fixed Costs per ton . . . . N.A. (partially covered in D

Capitalization Costs per ton . . . . N.A.

Cost of Rehabilitation per ton . . . . N.A.

Total Mining costs per ton (excluding Milling) . . . $4.435

Milling Costs per ton $1.019

Total Costs per ton including Mining & Milling . . . $5.454

Market: Mill Distance to Market: 10 miles

Haulage Costs: $0.0501/ton-mile

Method of Waste Disposal: N A

Method of Mined Land Rehabilitation: N A

Remarks:

Indirect Costs

Labor, Management, Supervision, Clerical $0.314

Mine Office, Warehouse - N.A

Payroll Overhead - Social Security, Insurance - $0.127.

Union Welfare, etc. N/A

Medical and Life Insurance - $0.077

Royalties N.A

Pension Funds N.A

Severance Tax - $0.002 (state tax)

Rehabilitation Costs N.A

Direct Operating Costs

Production Labor $2.510 (includes core & blasthole drilling $0.7

Maintenance Labor - $0.077

Operating Supplies, Powder, Steel - $0.585

Utilities - $0.249

Transportation Mine to Mill $0.404

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment

Fixed Costs

Property Taxes N.A

Other Fixed Taxes (Severance)* N/A

Depreciation N.A

Interest N.A

General Management covered in indirect costs

Selling, Marketing N.A

Capital Costs

Working Capital N.A

Purchase Cost N.A.

Capitalization of Exploration and Development N/A

Roads and other local construction N.A

Capitalization of Equipment N.A

Capitalization of Plant N.A

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1947

State: New Mexico

Mining Dist. or County: Pinos Altos

Mine: Atlas No. 2

Owner: Andrew B. Stewart

Type of Deposit: Marmatite and galena replacement of limestone, 55' thick
10% Zn, 2.5% Pb, 3oz. Ag

Mining Method: Open Stope

Type of Milling: Flotation

Tonnage: 1500 T/mo.

No. of Employees:

Tons per man-shift: 4.4

Miners Wage: 1.25/hr.

Exploration Costs per ton:	$
Development Costs per ton:	
Direct Mining Costs per ton:	3.14
Indirect Costs per ton:	
Depreciate of Plant & Equipment per ton	
Total Costs excluding milling costs (per ton)	$
Milling Costs per ton:	4.97 1/
Total Costs including milling costs (per ton)	$

Source: USBM IC 7524

Remarks: Labor 61% Supplies and power 39%

1/ Includes haulage ($1.10), freight ($0.37), and custom milling ($3.50/ton)

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1956

State: Oklahoma

Mining Dist. or County: Tri-State

Mine: Piokee

Owner: Eagle-Picher Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 75' thick, 2.85% Zn, 0.57% Pb

Mining Method: Open Stope

Type of Milling:

Tonnage: 390 T/day

No. of Employees:

Tons per man-shift: 16.9

Miners Wage: 1.55/hr.

Exploration Costs per ton:....................................	$Included in Direct Mining
Development Costs per ton:....................................	0.12
Direct Mining Costs per ton:....................................	1.88
Indirect Costs per ton:....................................	Included in Direct Mining
Depreciation of Plant & Equipment per ton................	Included in Direct Mining
Total Costs excluding milling costs (per ton)............	$ 2.00
Milling Costs per ton:....................................	
Total Costs including milling costs (per ton):............	$

Source: USBM IC 7930

Remarks: Regular tri-state district mining

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 195[illegible]

State: Oklahoma

Mining Dist. or County: Tri-State

Mine: Pickee

Owner: Eagle-Picher Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 75' thick 2.85% Zn, 0.05% Pb.

Mining Method: Open Stope

Type of Milling:

Tonnage: 390 T/day

No. of Employees:

Tons per man-shift: 55.5

Miners Wage: $1.63/hr.

Exploration Costs per ton:	Not included
Development Costs per ton:	0.01
Direct Mining Costs per ton:	1.24
Indirect Costs per ton:	Included
Depreciation of Plant & Equipment per ton:	Included
Total Costs excluding milling costs (per ton):	1.25 *
Milling Costs per ton:	
Total Costs including milling costs (per ton):	

Source: USBM IC 7930

Remarks: Experimental mining using most modern equipment and bonuses

* Excluding exploration costs.

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1954-55

State: Illinois

Mining Dist. or County: Jo Daviess County

Mine: Gray

Owner: Tri-State Zinc, Inc.

Type of Deposit: Sphalerite and galena replacement in limestone, 60' thick

Mining Method: Open stope

Type of Milling: Jigging, flotation

Tonnage: 1,000 T/day

No. of Employees: 28

Tons per man-shift: 36.2

Miners Wage:

Exploration Costs per ton:	$ Included in totals
Development Costs per ton:	Included in totals
Direct Mining Costs per ton:	1.09
Indirect Costs per ton:	Not included in totals
Depreciation of Plant & Equipment per ton:	Not included in totals
Total Costs excluding milling costs (per ton)	$ 1.09
Milling Costs per ton:	0.78
Total Costs including milling costs (per ton):	$ 1.87

Source: USBM IC 7780

Remarks:

RECENT MINING COST DATA

Mineral: Zinc-Lead **Year:** 1948

State: Idaho **Mining Dist. or County:** Coeur d'Alene

Mine: Highland Surprise

Owner: Highland Surprise Consolidated Mining Co.

Type of Deposit: Sphalerite and galena, vertical veins, 2-25' wide

Mining Method: Shrinkage and cut and fill (below 700' level because of weak walls)

Type of Milling: Flotation

Tonnage: 275 T/day **No. of Employees:**

Tons per man-shift: 3.5 **Miners Wage:**

Exploration Costs per ton:	$ Included in Direct Mining
Development Costs per ton:	Included in Direct Mining
Direct Mining Costs per ton:	6.74
Indirect Costs per ton:	General 0.75
Depreciation of Plant & Equipment per ton:	
Total Costs excluding milling costs (per ton)	$ 7.49
Milling Costs per ton:	1.41
Total Costs including milling costs (per ton):	$ 8.90

Source: USBM IC 7560

Remarks: 95% extraction

RECENT MINING COST DATA

Mineral: Zinc-Lead

Year: 1951

State: Idaho

Mining Dist. or County: Coeur d'Alene

Mine: Morning

Owner: American Smelting & Refining Co.

Type of Deposits: Sphalerite and galena in near vertical veins, Ore width 3-40'
5.7% Pb, 8.1% Zn, 2.0 oz. Ag

Mining Method: Stull set and fill

Type of Milling: Flotation

Tonnage: 320 T/day

No. of Employees:

Tons per man-shift:

Miners Wage: $12.45/day

Exploration Costs per ton:	$	Not included in totals
Development Costs per ton:		Included in Direct Mining
Direct Mining Costs per ton:		13.72
Indirect Costs per ton:	General	3.32
Depreciation of Plant & Equipment per ton:		
Total Costs excluding milling costs (per ton)	$	22.04*
Milling Costs per ton:		2.03
Total Costs including costs (per ton):	$	24.07*

Source: USBM IC 7743

Remarks: Heavy ground, ceased operation in 1953

* Excluding exploration costs

RECENT MINING COST DATA

Mineral: Zinc-Lead **Year:** 1955

State: Oklahoma **Mining Dist. or County:** Tri-State

Mine: Rialto

Owner: American Zinc, Lead and Smelting Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 2.73% Zn, 0.21% Pb

Mining Method: Open Stope

Type of Milling:

Tonnage: 1,150 T/day **No. of Employees:**

Tons per man-shift: 15.0 **Miners wage:** 1.50/hr.

Exploration Costs per ton:	$	Not included in Direct Mining
Development Costs per ton:		Not included in Direct Mining
Direct Mining Costs per ton:		1.76
Indirect Costs per ton:		Not included in Direct Mining
Depreciation of Plant & Equipment per ton:		Not included in Direct Mining
Total Costs excluding milling costs (per ton)	$	
Milling Costs per ton:		
Total Costs including milling costs (per ton)	$	

Source: USBM IC 7823

Remarks:

RECENT MINING COST DATA

Mineral: Zinc-Lead **Year:** 1954

State: Kansas **Mining Dist. or County:** Tri-State

Mine: Westside

Owner: Eagle-Picher Co.

Type of Deposit: Sphalerite and galena replacement in limestone, 40-50' thick, 2.8% zn, 0.7% pb

Mining Method: Open Stope

Type of Milling:

Tonnage: 775 T/day **No. of Employees:** 30

Tons per man-shift: 22 Miners Wage: 1.40/hr.

Exploration Costs per ton:.................................... $ Not included in Direct Mining

Development Costs per ton:.................................... Not included in Direct Mining

Direct Mining Costs per ton:.................................... 1.27

Indirect Costs per ton:.................................... Included in Direct Mining

Depreciation of Plant & Equipment per ton.................. Included in Direct Mining

Total Costs excluding milling costs (per ton).............. $

Milling Costs per ton:.................................... ________

Total Costs including milling costs (per ton):.............. $

Source: USBM IC 7774

Remarks:

MISCELLANEOUS

RECENT MINING COST DATA

Mineral: Uranium　　Year: 1957

State: Utah　　Mining Dist. or County: Big Indian

Mine: Median for District

Owner:

Type of Deposit: Uraninite in Chinle & Cutter form., 6' aver. thickness, 0.35% $U_3 O_8$

Mining Method: Open Stope

Type of Milling:

Tonnage:　　No. of Employees:

Tons per man-shift:　　Miners Wage:

Exploration Costs per ton:	$	1.00
Development Costs per ton:		1.00
Direct Mining Costs per ton:		6.00
Indirect Costs per ton:		2.00
Depreciation of Plant & Equipment per ton:		1.00
Total Costs excluding milling costs (per ton):	$	11.00
MIlling Costs per ton:		21.50*
Total Costs including milling costs (per ton):	$	

Source: Uranium, Feb. 1958

Remarks: Ore worth about $54.75/ton at mine with all allowances (except haulage) and bonuses (based on AEC Cir. 5 & 6).

* Not a cost to the miner.

RECENT MINING COST DATA

Mineral: Uranium
Year: 1957

State: Colorado
Mining Dist. or County: Uranan Mineral Belt

Mine: Median for district

Owner:

Type of Deposit: Carnotite in Morrison S.S. form., 3' aver. thickness, 0.28% $U_3 O_8$, 1.00 - 1.25% $V_2 O_5$

Mining Method: Open Stope

Type of Milling:

Tonnage: 70 T/day aver.
No. of Employees:

Tons per man-shift: 2.3
Miners Wage:

Exploration Costs per ton:................................	$	2.00
Development Costs per ton:.............................		3.00
Direct Mining Costs per ton:............................		11.00
Indirect Costs per ton:.....................................		2.00
Depreciation of Plant & Equipment per ton:...............		2.00
Total Costs excluding milling costs (per ton)............	$	20.00
Milling Costs per ton:.......................................		14.30*
Total Costs including milling costs (per ton)............	$	

Source: Uranium, Feb. 1958

Remarks: One worth about $46.60/ton at mine with all allowances (except haulage) and bonuses (based on AEC Cir. 5 & 6).

Not a cost to the miner

RECENT MINING COST DATA

Mineral: Uranium

Year: 1957

State: Utah

Mining Dist. or County: White Canyon - Monument Valley

Mine: Median for District

Owner:

Type of Deposit: Copper-Uranium (Uraninite) minerals in Shinarump conglomerate 4' aver. thickness, 0.25% U_3O_8.

Mining Method: Open Stope

Type of Milling:

Tonnage:

No. of Employees:

Tons per man-shift:

Miners Wage:

Exploration Costs per ton:	$ 2.00
Development Costs per ton:	1.50
Direct Mining Costs per ton:	8.50
Indirect Costs per ton:	2.00
Depreciation of Plant & Equipment per ton:	2.00
Total Costs excluding milling costs (per ton):	$ 16.00
Milling Costs per ton:	14.70*
Total Costs including milling costs (per ton):	$

Source: Uranium, Feb. 1958

Remarks: Ore worth about $38.25/ton at mine with all allowances (except haulage) and bonuses (based on AEC Cir. 5 & 6).

Not a cost to the miner.

RECENT MINING COST DATA

Mineral: Uranium

Year: 1957

State: Wyoming

Mining Dist. or County: Gas Hills

Mine: Median for District

Owner:

Type of Deposit: Uraninite, coffinite in Tertiary SS., 6' aver. thickness, 0.225% $U_3 O_8$, secondary minerals where oxidized.

Mining Method: Open pit, stripping ratio 5-1, 8-1, 12-1

Type of Milling:

Tonnage:

No. of Employees:

[illegible]ns per man-shift:

Miners Wage:

	5-1	8-1	12-1
Exploration Costs per ton:	$ 0.30	0.50	0.70
Development Costs per ton:	2.00	3.20	4.80
Direct Mining Costs per ton:	1.25	1.25	1.25
Indirect Costs per ton:	0.75	0.75	0.75
Depreciation of Plant & Equipment per ton:	0.50	0.50	0.50
Total Costs excluding milling costs (per ton):	$ 4.50	6.30	8.00
Milling Costs per ton:			
Total Costs including milling costs (per ton):	$		

Source: Uranium, Feb. 1958

Remarks:

RECENT MINING COST DATA

Mineral: Uranium

Year: 1957

State: New Mexico

Mining Dist. or County: Ambrosio Lake

Mine: Median for District

Owner:

Type of Deposit: Coffinite in Morrison form., 8' aver. thickness, 0.25% $U_3 O_8$

Mining Method: Open Stope

Type of Milling:

Tonnage:

No. of Employees:

Tons per man-shift:

Miners Wage:

Exploration Costs per ton:................................	$ 0.50
Development Costs per ton:................................	1.50
Direct Mining Costs per ton:..............................	7.50
Indirect Costs per ton:...................................	1.50
Depreciation of Plant & Equipment per ton:................	1.00
Total Costs excluding milling costs (per ton):............	$ 12.00
Milling Costs per ton:....................................	11.20*
Total Costs including milling costs (per ton):............	$

Source: Uranium, Feb. 1958

Remarks: Ore worth about $28.25/ton at mine with allowances (except haulage) and bonuses (based on Cir. 5 & 6, AEC).

* Not a cost to the miner.

RECENT MINING COST DATA

Mineral: Fluorspar **Year:** 1959

State: Colorado **Mining Dist. or County:** Jackson County

Mine: Northgate

Owner: Ozark-Mahoney Company

Type of Deposit: Fluorite veins in fault zones in pre-cambrian granite
aver width less than 20' near vertical veins

Mining Method: Shrinkage

Type of Milling: Flotation, grinding to-325 mesh.

Tonnage: 300 T/day **No. of Employees:**

Tons per man-shift: **Miners Wage:**

Exploration Costs per ton:	$
Development Costs per ton:	
Direct Mining Costs per ton:	5.00
Indirect Costs per ton:	
Depreciation of Plant & Equipment per ton:	
Total Costs excluding milling costs (per ton):	
Milling Costs per ton:	5.00
Total Costs including milling costs (per ton):	$

Source: Colorado State Office

Remarks: Back weak, timbering necessary, $34/ft to drive 5' x 7' drift.

RECENT MINING COST DATA

Mineral: Gold - Silver

Year: 1957

State: South Dakota

Mining Dist. or County: Lead Dist.

Mine: Bald Mountain - 3 mines

Owner: Bald Mountain Mining Co.

Type of Deposit: Replacement in sediments

Mining Method: Shrinkage open overhand and room and pillar

Type of Milling: Straight cyanidation

Tonnage: 330 T/day

No. of Employees: 95

[illegible]ons per man-shift:

Miners Wage:

Exploration Costs per ton:	$	Not included in totals
Development Costs per ton:		Not included in totals
Direct Mining Costs per ton:		2 90 1/
Indirect Costs per ton:		Included in totals
Depreciation of Plant & Equipment per ton:		Not included in totals
Total Costs excluding milling costs (per ton):	$	2.90
Milling Costs per ton:		1.65
Total Costs including milling costs (per ton):	$	4.55 2/

Source: Mining World May 1957

Remarks: Refactory ore mill heads $6.24/ton, recoverable value $5.35/ton, Gross profit $0.80/ton.

1/ Includes indirect costs

[illegible]/ Does not include exploration, development, depletion, depreciation or taxes.

750,000 lb. U_3O_8/yr

MINING COST DATA

MINERAL: Uranium

YEAR: 1976

State: N.A

Cost Model For Solution Mining of Uranium

District or County: N.A.

Mine: Unnamed

Owner or Operator: N.A

Source of Information: Uranium Industry Seminar Oct 19-20, 1976 ERDA

Type of Deposit: The model deposit is at a depth of 500 ft and consists of horizontally bedded sandstones bounded by impervious layers of clay and shale. The permeability of the sandstone is sufficient to allow the passage ①

Mining Method: Solution mining

Tonnage: 750,000 lbs. U_3O_8/yr produced

No. of Employees: ②

Tons per Man-shift: N.A.

Miners Wages per time period: N.A

Direct Mining Costs per ~~ton~~ . . . . $3.450/lb U_3O_8

Indirect Mining Costs per ~~ton~~ . . . . $1.862/lb U_3O_8

Fixed Costs per ~~ton~~ . . . . N.A

Capitalization Costs per ~~ton~~ . . . . $5.519/lb U_3O_8

Cost of Rehabilitation per ~~ton~~ . . . . $0.053/lb U_3O_8

Total Mining costs per ~~ton~~ (excluding Milling) . . . $10.884/lb U_3O_8

Milling Costs per ~~ton~~ . . . . $3.847/lb U_3O_8

Total Costs per ~~ton~~ including Mining & Milling . . $14.73/lb U_3O_8

Market: Mill

Distance to Market: N.A

Haulage Costs: N.A.

Method of Waste Disposal: N.A

Method of Mined Land Rehabilitation: N.A.

Remarks:

③

① of the leaching solution. The ore zone is below the static water table. The mineralized zone is 26 ft thick and has an average grade of 0.05 percent U_3O_8.

② 23 - mining
26 - milling

③ Cost information available for 250,000 lb U_3O_8/yr. 500,000 lb U_3O_8/yr and 1,000,000 lb U_3O_8/yr. The costs are not broken down as completely as the case concerning 750,000 lb U_3O_8/yr

750,000 lb. U_3O_8/yr

Indirect Costs

Labor, Management, Supervision, Clerical } - \$0.587/lb U_3O_8 (G&A)
Mine Office, Warehouse

Payroll Overhead - Social Security, Insurance N.A

Union Welfare, etc. N.A

Medical and Life Insurance N.A

Royalties - \$1.216/lb U_3O_8

Pension Funds N.A

Severance Tax N.A

Rehabilitation Costs - on cost summary

Laboratory Allocation - \$0.059/lb U_3O_8

Direct Operating Costs

Production Labor } \$0.752/lb U_3O_8 (Payroll)
Maintenance Labor

Operating Supplies, Powder, Steel - \$0.533/lb U_3O_8

Utilities - \$1.000/lb U_3O_8

Transportation Mine to Mill N.A

Freight, Supplies Delivered N.A

Future Development Costs N.A

Maintenance and Service of Equipment N.A

Chemicals - \$0.733/lb U_3O_8

Miscellaneous - \$0.237/lb U_3O_8

Pumping costs - \$0.195/lb. U_3O_8

Fixed Costs N.A

Property Taxes

Other Fixed Taxes (Severance)

Depreciation

Interest

General Management

Selling, Marketing

750,000 lb. U_3O_8/yr

Capital Costs

Working Capital N.A

Purchase Cost – $0.170 (Acquisition)

Capitalization of Exploration and Development – $0.850

Roads and other local construction N.A

Capitalization of Equipment – $0.349

Capitalization of Plant – $1.407 (Mill)

Primary Development – #2.743